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35

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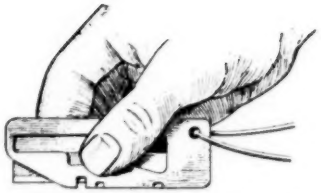

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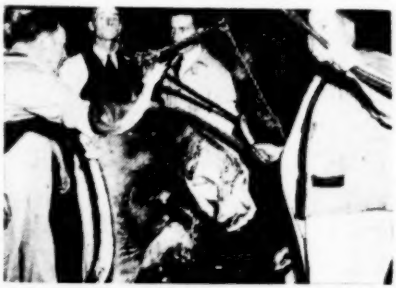

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The Farmer's Digest

Volume 21 February 1958 Number 8

Is Showing Cattle Right or Wrong?

Read what some of the world's greatest experts on dairy cattle say about this question . . .

Condensed from Dairy Farmer (England)

From England, Dairy Farmer's editors asked these experts . . .

Dr. John Hammond, late University of Cambridge, England.

Professor H. O. Henderson, West Virginia University, U.S.A.

Dr. C. K. McMeekan, Ruakura Animal Research Station, New Zealand.

Professor W. E. Peterson, University of Minnesota, U.S.A.

Dr. Ole Venge, Royal Agricultural College, Uppsala, Sweden.

Professor E. W. Swanson, University of Tennessee, U.S.A.

Dr. A. Hansson, Animal Breeding Institute, Wiad, Sweden.

These questions:

Do you consider that type and conformation in dairy cows and bulls have any relationship to production ability and genetic production potential?

Dr. Hammond . . .

Yes—hind legs and stance of bulls must be good or cows will fail to support heavy holders.

Conformation has no relation to genetic production potential, but if faulty may prevent the potential being expressed in actual yield. If cows are to be fed on grass and bulky foods they need a good barrel.

Professor Henderson . . .

From the phenotypic standpoint a cow needs good feet and legs to forage; a large barrel is indicative of large rumen capacity for food and water, a well-attached udder hinders possi-

Reprinted by permission from Dairy Farmer, Lloyds Chambers, Ipswich, England

bilities for injury, and size and placement of teats and a preponderance of secretory tissue is essential for ease of milking and quantity of milk. These are but a few examples of the many that could be cited in defense of the relationship between type and conformation and producing ability.

To produce 100 bushels of corn, the soil needs to supply 160 pounds of nitrogen, 40 pounds of phosphoric acid and 100 pounds of potash.

A new man in our department, Mitchell, recently completed a PhD thesis based on type and production records from 45,000 Holstein-Friesian cows. This was the largest study of its kind ever undertaken; it indicated that there is a high genetic relationship between dairy character and production.

Dr. McMeekan . . .

Yes—with qualifications. I believe the weight of evidence suggests strongly that certain type characteristics are a consequence *but not a cause* of production performance. Under New Zealand systems of judging on type, over 40 per cent of the points are alloted for "beauty" characters that have no association with production ability.

Certain type characteristics may, nevertheless, be important in determining the economic worth of a cow.

Thus, in New Zealand where output per man is the key factor of determining efficiency, ease of machine milking without stripping is a basic requirement.

Professor Peterson . . .

With the exception of the udder and beefiness I do not believe that type and conformation in dairy cows have any relationship to production ability.

Dr. Venge . . .

Concerning the relationship between conformation and production, I do not think one exists. It is therefore of no value to relate conformation to production ability, and especially to the genetic production potential.

The same applies to type of dairy cow and production ability. Within a breed it is of no use to consider the type, and the differences in types between breeds of dairy cattle are the products of special breeding programs and have no relation to reality.

Professor Swanson . . .

Studies of this subject have shown a *slight* correlation between overall type scores and production in cows. There is greater relationship between production and type characteristics indicative of body size than other characteristics. But none of the correlations which has been determined from numerous careful

studies is large enough to be useful for prediction purposes.

So, for *practical purposes,* the slight relationship which exists between type and production is insignificant. The relationship between type of bulls and production of the bulls' daughters is not significant, and it is entirely useless to seek to influence production of cows through the body type of bulls.

Dr. Hansson . . .

Type and conformation have a relationship to the beef qualities of the calves obtained in crosses with beef breeds. Conformation of the udder is also an important character. In our country less and less attention has been paid to type and conformation during recent years.

If you hold that certain conformation points are related to production merit, will you please list these points in order of importance, saying how you consider they each directly or indirectly relate to production merit?

Dr. Hammond . . .

In addition to above —

Width between legs so as to have a broad-based udder which will not become pendulous with age.

Professor Henderson . . .

In Mitchell's study, herds were stratified according to production.

Dairy character is the type rating that consistently exhibited a high degree of genetic association with production. Mitchell's study found that dairy character consists of "animation, angularity, general openness, and freedom from excess tissue, giving due regard to period of lactation."

Only 1/10 of the area of China is arable, but 4/5 of Chinese men till the soil.

Whether an individual places much confidence in type classification or judging, it is my contention that the aforementioned characteristics form the basis for a "cowman's" judgment in his selection of high-producing dairy cattle.

Dr. McMeekan . . .

(a) Size—in New Zealand under free-grazing conditions where output per acre is a key factor in the efficiency of conversion of grass to milk, *small* cows are more efficient than large cows on average, markedly so if they are of the same productive level.

(b) Wedge-shaped conformation while in milk is an indication of the routing of nutrients to production of milk rather than to flesh and fat.

(c) A large well-developed udder of spongy texture when milked out is an indication of capacity.

(d) Teats neither so large nor so small as to cause trouble in machine milking and of correct structure to permit easy machine milking without stripping.

(e) Sound feet, since in New Zealand cows must walk to collect their food.

(f) Normal jaws—neither undershot not overshot—since our cattle must collect their own food. Defective mouths handicap cows during periods of adversity irrespective of productive ability.

These points are not in order of importance. They are all essential in the efficient cow.

Professor Peterson . . .

The shape and attachment of the udder is related to milking characteristics and life-time production.

The udder with a flat floor and teats protruding squarely therefrom milks out better than the udder that is quartered. The pendulous udder is more susceptible to injury in mastitis than the udder that is well supported.

Dr. Venge . . .

It is clear that the udder is of importance for production merit, but it is a matter of physiology and not conformation. However, the physiological status of the udder is related to the animal's general condition.

Indirectly a good udder with well-formed teats is of importance for a high yield. It has often been said that one can judge production ability by examining the udder and milk veins, etc., but no reliable investigations—as far as I know—have unveiled any correlation between udder conformation and milk yield.

The shape and size of the udder and teats must be seen in the light of machine milking.

Agriculture Secretary, Ezra Benson says he will cut price supports on dairy products to the legal limit of 75 per cent of parity. The cut will be made for the marketing year starting next April 1st.

Professor Swanson . . .

Numerous studies have shown a significant correlation between size of cow and producing ability within breeds.

The effect of size on production is indirect and not absolute, as size alone cannot control milking ability. It is just that large, good dairy cows are capable of eating more and producing more than small, good dairy cows.

Size and structure of udder can directly affect producing ability. It is possible for cows to produce only as much milk as the udder will contain; and even though the potential to manufacture more milk may exist, the limiting size of the udder would prevent

its expression. However, a large udder does not ensure high production because large udders may be found on cows which lack the potential to make milk to fill their udders. There are probably more cows whose udders are too large for their productive ability than vice versa.

Dr. Hansson . . .

Beef production (crossbreeding): 1. Early maturity, 2. Rate of growth. Milk production: 1. Udder conformation, 2. Leg-strength.

Do you think that showing dairy cattle and judging them by type and conformation serves no useful purpose?

Dr. Hammond . . .

No.

Professor Henderson . . .

It is obvious from the preceding answers that I definitely feel that showing dairy cattle and judging them by type and conformation is very useful.

Dr. McMeekan . . .

Modern showing and judging of dairy cattle is a "sporting" event and as such fulfils a useful function amongst the farming community. It is a harmful process if its participants really believe that by breeding and selecting for beauty they must necessarily achieve utility.

Professor Peterson . . .

From a standpoint of contributing to usefulness in improving production—no.

From the standpoint of competition and recognition of beauty in animals—yes.

Dr. Venge . . .

I will not say that showing of dairy cattle serves no useful purpose.

During the California gold rush, home-made pies sold for $10.00, beans for $2.00 a pound, rooms often rented for $1,000 per month. Many fortunes were made by those who provided services, rather than hunted gold.

Judging of dairy cows can be justified if attention is directed towards "constitution" or "condition" (general health, legs, normal developed and healthy udder, teats, etc.) But using different point scales in order to range the cows according to conformation and type has no sound sense.

Professor Swanson . . .

Selection of cattle on the basis of type and conformation cannot serve the purpose of selecting high-producing cows.

It would not be entirely correct, however, to state that selection on the basis of type serves *no* useful purpose. Good type cows will still sell for more than poor type cows even if their production is equal. Good type is also desirable because of its po-

tential for improving the economic life of the cow.

Dr. Hansson . . .

Though showing dairy cattle and judging them by type and production has a very limited value, it may stimulate the general interest in dairy cattle breeding.

Do you think that showing and judging cattle can be modernized by using a more scientific appraisal of essential conformation points?

Dr. Hammond . . .

Yes—no cow should be shown unless she has reached a certain level of production. Cows then should come into the ring with labels of 3 colors—high, medium and low-producers so that the judge (and public) can see what they have done before selecting on conformation. This applies particularly to dual-purpose cows (including Friesian).

Professor Henderson . . .

Showing and judging should be modernized by using a more scientific appraisal of essential conformation points. Dairy character or "milkiness," or whatever the term that is best suited, should definitely be given more weight in this regard. The other three main categories on the scorecard should be retained, but with less emphasis placed on them.

Dr. McMeekan . . .

Yes.

Professor Peterson . . .

I doubt it.

About a million acres of tillable land is taken out of circulation each year — used for roads, homes, factories, airports, etc.

Dr. Venge . . .

Up to date we have no scientific methods for evaluation of special conformation points. One can make measurements of the body, of special body parts, the slope of the udder or hindquarters, the length and diameter of the teats and so on, but we will probably find that the correlation between different characters and production merit is zero.

Professor Swanson . . .

If the purpose of "modernizing" is to improve the correlation between type and production, I do not believe this change would be successful.

The correlation of yearly production with type is not a logical expectation because type is primarily determined by exterior appearance, whereas production is determined by internal function.

The latter cannot be seen or measured in any practical manner except by measurement of the end product—milk.

Dr. Hansson . . .

Much more attention should be paid to the actual milk production of the cow, and especially to the life-time production.

Do you think that showing and judging should continue as at present?

Dr. Hammond . . .

Showing and judging should not continue as at present, especially in dual-purpose breeds.

Professor Henderson . . .

Not at the present scoring system. One animal may be superior to another in every respect save one, and yet, at the discretion of the judge, may lose from 1 to 30 points on general appearance or mammary system.

If there are to be points assigned, they should be broken down into smaller categories so that no more than 4 or 5 points would be lost for any one individual minor feature.

Dr. McMeekan . . .

See answers to the two previous questions.

Professor Peterson . . .

With the current emphasis on showing type being contributive to production, no.

Dr. Venge . . .

Why not? If one adopts the viewpoint that shows exist as stimulation for breeders and can give an impulse to young people, then we can continue along the old line.

On the other hand, it must be emphasized that dairy cattle shows can do some harm. In my country we pay less and less attention to the general conformation and type of dairy cows.

Professor Swanson . . .

In any place where showing and judging are used as a substitute for production testing their continuance is undesirable because of the false impressions which are created.

The goal should be for proper education of dairymen concerning the respective values of type and production, emphasizing their low correlation. Programs of herd analysis would be more desirable than shows of selected animals.

Dr. Hansson . . .

(No reply).

If you believe that judging on conformation has no relation to production merit, would you say that farmers are holding back the full commercial development of dairy cattle by attending to these points when they would be wiser to concentrate entirely on production records?

Dr. Hammond . . .

(No reply).

Professor Henderson . . .

We believe dairymen would be foolish to try to make any satisfactory increase in production by selection on the basis of type only.

If selection for production alone is practiced, a herd of high-production cows, poor in udder shape (resulting in a high incidence of mastitis), poor in feet and legs (unable to get about the pasture), or poor in some other character, may result.

Consideration of both type and production is necessary if the herd is to be improved.

Dr. McMeekan . . .

Dairy cattle breeding with the objective of increased efficiency, is difficult enough without cluttering it up with the need to select for a large number of characters not necessarily associated with production performance.

To the extent that modern methods of judging direct attention to such characters they are harmful to continued improvement of dairy stock.

Professor Peterson . . .

There is no question that the emphasis put on type has been the cause of eliminating valuable breeding animals.

Dr. Venge . . .

The basis of milk production is good fertility. Cows should be bred for femaleness, and bulls should possess typical male characters. This is applied endocrinology.

With these two points in mind farmers could do far better if they concentrated on yield in healthy animals and only 'squinted' at conformation. By paying attention to conformation farmers automatically feed calves and heifers too high, forgetting that a low plane of nutrition during the first 1-1½ years prepares the animal for higher yield and better longevity.

Professor Swanson . . .

Type and conformation have valuable attributes besides merely sales value.

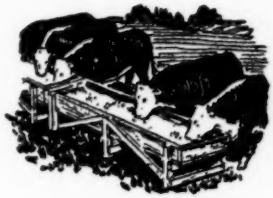
It might, for example, be more economical to have cows with desirable type udders that gave less milk than those with pendulous udders because the former could be expected to remain profitable for many more years than the latter.

The foundation of selection must be production testing, but type and conformation should also be considered. Only when production testing is avoided, ignored, or prevented by emphasis on type selection is there danger of holding back the commercial improvement of dairy cattle.

Dr. Hansson . . .

I believe one should concentrate more on records of production merit, but to stimulate general interest it may be wise also to pay attention to type and conformation—perhaps by showing progeny groups from outstanding bulls and cows.

Will You Soon Feed Nothing But Pellets?



Boosters are enthusiastic. Here are the latest feedlot results and costs with beef cattle, sheep and hogs . . .

Condensed from Farm Journal

Ovid Bay and *John Rohlf*

THE biggest beef feeding story of 1958 could very well be the use of completely pelleted rations. The idea is being tested at colleges and in feedlots from California to Ohio. Results so far range from "good" to "amazing."

Pelleting of poultry and hog feeds has been going on for quite awhile. And several of the biggest and most successful lamb feeders in the country have fed nothing but all-pelleted feeds for several years. We'll tell you more about these later.

The new idea is finishing out big 800-pound steers on dainty 3/16-inch pellets. It just hasn't seemed the thing to do. Why go to all of the bother and expense to grind and pellet such things as hay and corn for an animal with four big stomachs?

The best answer, coming out of the tests, is that the animals themselves seem to like the idea. They gain faster and on less feed than their "kin" fed the same feeds that are unpelleted. They are ready for market quickly. And they often make those fast, economical gains on feeds, particularly roughages that are lower in quality.

Most dramatic example are tests at Illinois' Dixon Springs Experiment Station. There researchers wintered calves for two winters on nothing but pellets made of two-thirds timothy and one-third alfalfa hay—no grain, while other steer calves got straight alfalfa hay. The pellet fed calves gained an average of 1.73 pounds per day; those getting the baled alfalfa hay, only .63 pound!

As you'd expect, the calves in this 119-day test ate more pellets than hay—about 50% more by weight. But they put every pound to good use—ate but slightly more than half as much per lb. of gain. Valuing gains at a conservative 18 cents a pound, the Illinois scientists found the hay pellets worth $39.73 a ton; the baled hay $20.79. Actual cost of

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

grinding and pelleting the hay was $10 a ton, which left a net advantage of about $9 a ton.

The same idea may speed growth with dairy calves, too. In an Ohio test, calves fed a one-third grain, two-thirds alfalfa pellet gained twice as fast from 4 to 12 weeks as others getting the same feeds not pelleted.

The average American family has an annual income, after taxes, of $4,800.

But what about yearlings? Won't you run into bloat or digestive troubles when you feed no "bulk" feeds at all?

Some researchers say "yes." Others like Bob Webb in Illinois, have had no trouble. Says Webb: "We started 60 steers right out on a complete pelleted ration last year. Not one showed *any signs* of digestive disturbances nor cravings for anything not in the ration. And the pellets that we fed 15 of 'em had only 25% roughage. The 60 head averaged 2.77 pounds gain per day for the 153 days, at a cost—including $6 a ton for pelleting—of $17.58."

Many lamb feeders will tell you they feed pellets to *get away from digestive troubles.*

Charlie Waller, who has fed out close to a million lambs in his 25 years in New Mexico's Pecos Valley, now self-feeds cubes entirely. He never vaccinates or drenches a lamb for over-eating. They go on self feeders the minute they hit the lot.

Waller's death loss last year was less than ½ of 1% on 40,000 lambs. He adds 5 pounds of Aurofac 2-A, or its equivalent level of either aureomycin or terramycin, to each ton of pellets.

Pelleting has also given consistent and sizeable feed-savings plus a speed up in gains. An average of 12 college tests—where the pellets ranged from 70% roughage and 30% concentrate to the exact opposite—show 22% faster gains and 21% feed saving.

A wide variety of feeds were used. Among the roughages were alfalfa hay (sun-cured and dehydrated), sorghum fodder and timothy hay. The concentrates included corn, grain sorghum, oats, barley, dried beet pulp, molasses and protein supplements.

Carcass grades varied quite a bit because in some of the tests the lambs were sorted as they reached grade. But these figures on 538 head all fed for the same length of time, show an advantage for pellets; on pelleted feeds, 2% Prime, 79% Choice, 18% Good, 1% Utility; on the same feeds unpelleted, no Prime, 68% Choice, 30% Good, 2% Utility or Cull.

One of the most interesting things about pelleting is the feed

value it apparently adds to "junk" feeds. Last winter Herb Clutter, Kansas lamb feeder, finished 7,000 lambs on complete pellets that included 30% sorghum stubble stalks that he gathered with a field chopper after combining the grain. The rest of the ration was 40% alfalfa hay and 30% concentrate.

"These lambs gained 30% faster, or about a tenth of a pound a day more, than other lots that were on a good-quality alfalfa hay," reports Clutter.

In a recent Illinois test, lambs getting pellets made of timothy hay and corn did better than others getting pellets made of alfalfa hay and corn.

Waller, the New Mexico feeder, shops for low-quality hay. If he can't get it for a reasonable price, he mixes good alfalfa half-and-half with low-grade roughages such as cotton seed hulls, sorghum bundles or oat straw.

Tests in North Dakota show that barley when pelleted can be a "better" feed than corn for hogs. In Montana there was an average feed saving of 68 pounds per hundred pounds gain when porkers were fed a pelleted barley-oats-wheat ration, compared with the same ingredients in meal form. And a Washington State College test showed a 30% saving in feed when the ingredients were pelleted.

Most scientists like the idea of pelleting because the animal has to eat the complete ration in the amounts formulated. There's no chance for it to pick and choose.

And they point out these additional advantages:

- You lose less feed—from waste left in the bunk or from nosing out.
- You need less labor and equipment. Just fill self-feeders. "We can make a pellet-feeding expert out of a willing man in a week," says Charlie Waller.
- You can get by with less storage space. The exact saving depends upon pellet make-up, but you could save up to 80% with a high roughage pellet. Or you could get roughages under roof that you now store out in the weather.

While there are still a few non-believers, the majority of scientists and feedlot operators who have given pellets a good try think pelleting has a bright future.

The case is particularly solid for lambs. Says W. C. Weir, California researcher: "In our tests they've eaten more, gained faster and showed greater feed efficiency. In some cases we've gotten twice as many lambs grading Choice on pellets as we have on unpelleted feed."

And, as we said at the start of this report, pelleting could be the

big beef story for '58. The tests certainly look promising.

The cost of pellets and the job of getting your own feed pelleted are the big questions.

U. S. farm population is now 13 per cent of the total.

Most feed mills around the country are now equipped with pelleting machinery. For instance, Herb Clutter, the Kansas feeder, hauls his feed to a nearby alfalfa-dehydrating plant and then hauls the pellets back to his feedlot. Some big lamb feeders rent machines from manufacturers. And a few, such as the Dodge Bros., Churchill County, Nev., own their own machines. Dodge Bros. feed pellets to cattle, hogs and sheep.

Several companies have portable pelleting machines either on the drawing boards or in early field tests. And at least one field hay pelleter is in operation. With the evidence mounting as to the feeding worth of pellets, these machines should be on the market before long.

What's a fair price per ton to pay for fine grinding, mixing and pelleting a ration?

It's hard to answer that to the exact dollar, but a good guide is the $6 to $7 a ton used by most experiment stations in calculating costs for a mixture of roughly half concentrate and half roughage. Most of them figure $10 a ton for an all-roughage pellet.

The big cost of pelleting is preparing the ingredients. If you've ground hay or other roughage on your own farm or ranch, you have an idea of the power needs.

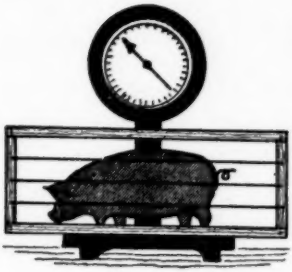
The actual pelleting operation probably should cost no more than $2 to $3 a ton. Size of pellet makes a difference, too. As you might expect, it costs less to make the bigger pellets. Pelleting machines now on the market are on the expensive side—cost $12,000 to $20,000 or more installed.

One tip as to the future of pellets comes from the commercial feed manufacturers. Each year they've steadily increased the percentage of feed sold as pellets. Probably more than 40% of the industry output is now pelleted.

A Ralston Purina spokesman says that 64½% of their 1957 production will be sold in pelleted form, compared with 52% five years ago. Purina recently started test-marketing a complete sheep pellet in the Northwest.

And Payway Mills of Kansas City sold 90% of their '57 output in pellet form. Says Oscar Straube, president of the firm: "We've gone to pellets because our customers demand them. The three main reasons they give us are less waste, greater efficiency and easier handling."

How to Forecast Hog Prices



Demand for hogs is governed by many variable factors. Here's a formula for estimating future prices . . .

Condensed from
Ohio Farm and Home Research

H. C. Williams and *R. W. Sherman,*
Ohio Agricultural Experiment Station

ONE of the major management decisions of hog producers is deciding on the number to produce. This decision is based on expected cost of production and expected prices.

The nature of cost production is such that cost is relatively easy to estimate. For example, the major cost in producing hogs is the cost of feed. Once the size of the corn crop is known, the cost of feed can be estimated with considerable accuracy. Other costs involved are relatively stable, and can also be estimated accurately.

No Controls

Expected prices, on the other hand, are influenced primarily by forces over which management has little control. They are more difficult to estimate and subject to greater error in forecasting with the information that is readily available.

To enable producers to do a better job of estimating future hog prices an improved basis must be provided. This can only be provided through an analysis of those factors and forces which affect the prices received.

In estimating future hog prices producers are faced with two questions. (1) What will be the price of hogs next year? (2) At what time (month) should I have my hogs ready for market in order to receive the highest price?

The answer to the first question lies in the year to year change in hog prices.

The answer to the second question lies in the seasonal changes in price within the year. This question is not considered in this study. While seasonal variation in hog prices is important to individual producers who attempt to increase income by marketing when prices are favorable, it is

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relatively unimportant to producers in the aggregate.

Hog prices and number of hogs marketed move in opposite directions. That is, when numbers marketed are low, prices are high; when numbers marketed are high, prices are low. As a result, if all producers, or a large number of producers attempt to market hogs when seasonal prices are high there would simply be a shift in the months when hog prices are highest. However, it is not likely that the average price for the year would be changed materially by such shifts in marketings.

Without adequate water in the soil, a crop can be slowly starving to death because it can't absorb the minerals needed for growth.

Why do hog prices change from year to year. What is responsible for the amount of the year to year price change?

To answer these questions it is necessary to consider the factors and forces which affect hog prices. These factors affect both the producer and buyer sides of the market.

The primary factor on the producer's side of the market is the quantity of pork produced. This is exactly equal to the number of hogs produced times the average weight. However this represents the end of decisions reached during the planning phase of production on the number to produce. What factors determine the number of hogs to produce?

It was found in this analysis of hog production from 1925-1951 that 95 per cent of the change from year to year in number of hogs produced could have been predicted by the size of the spring and fall pig crops of the previous year and the expressed intention of breeders in December of the previous year.

Taken separately: a 5 per cent change in the spring pig crop of the previous year was followed by a change of one per cent in next year's production; a change of 5 per cent in the size of the fall pig crop was followed by a change of 2 per cent in next year's production and a 5 per cent change in December intentions was followed by a 1 per cent change in production the following year.

Corn supply and hog-corn price ratio are so highly related to breeder's intentions that they can be omitted from the formula without seriously affecting the prediction.

Price Factors

On the buyer's side of the market there are a number of factors which affect hog price. Among them are (1) population,

(2) quantity of pork produced, (3) prices of other meats, (4) disposable income, (5) marketing charges, (6) consumption habits, and (7) size and age composition of families.

It takes the wage earner fewer minutes to earn a pound of meat today than at any time in the history of the United States.

The more important factors are market supply of hogs, disposable income and marketing charges. These three factors explain about three-fourths of the variation in hog prices. For the period 1929-51 the percentage increase in the quantity taken off the market was slightly greater than the percentage decrease in price. Hog producers in the aggregate received a slightly greater total income when a greater amount of pork was produced for market. Since any reduction in the quantity produced for market would lower total income to hog producers any control which would decrease output would appear to have an unfavorable effect on gross farm income received from hogs. To arrive at effect on net income it would be necessary to adjust the changing gross income by changes in costs of producing the different volumes. This is outside the province of this analysis.

It was found in this analysis that on the average for each one per cent change in real per capita disposable income that it could be expected that the price of hogs would change seven-tenths of one per cent. In other words, if real disposable income per capita were to rise by 10% we could expect that the price received by farmers for hogs would rise about 7%.

Increases in marketing charges result in decreases in hog prices because farm price is a residual of demand function minus such charges.

Proper ventilation in the poultry house this winter can save poultrymen money in three ways. In addition to promoting better flock health, ventilation may also be the key to maintaining winter production and efficient feed conversion, say agricultural engineers.

How can the above information be used to estimate future hog prices? A formula was developed on the basis of the factors previously discussed that can be used for predicting hog prices. When this formula was applied to the years 1950 through 1954 the predicted prices compare favorably with the actual prices received.

Comparison of actual prices and the estimated prices received by farmers per hundred pounds liveweight

Year	Actual Price	Estimated Price	Percent estimated is of actual price
1950	18.00	18.88	105
1951	20.00	20.69	103
1952	17.80	19.86	112
1953	21.40	22.28	104
1954	21.60	21.59	100

A comparison of these prices is presented in the above table:

It can be seen that in only one of these years was the error in predicting hog prices more than 5 per cent. This means that in estimating hog prices in four of the years the estimated price would have differed from the actual price by not more than 5 cents on the dollar. In one year, 1954, the formula almost exactly estimates the price of hogs.

Include Costs

The formula slightly overestimates the actual market price. This is probably due to the trend to more efficient production which would lead producers to offer more at existing prices than the normal price-quantity relationship would indicate. To overcome this, it is indicated that the predicting formula should include a measure of cost of production.

While the information presented here can provide an improved basis for estimating hog prices by individual producers, it could also be helpful to the legislator in setting agricultural policy. For example, suppose the aim of agricultural policy, were to raise income from hogs. How should it be done? High support prices? Low support prices? Direct payments to producers? Control of production? The answer lies in how producers respond to a change in price.

Sheep raisers are missing a bet to increase their income if they don't apply for incentive payments under the wool program. But to apply, they've got to complete records of all transactions.

From results of this analysis to date, it appears that price supports are ineffective in raising gross income to producers.

Minimum Tillage Cuts Corn Costs

How two farmers cut corn planting costs from $5.00 to $1.50 an acre . . .

Condensed from The Furrow

Ralph Hughes

IF YOU want to make money farming, you've got to watch your production costs. Although shopworn, this statement is a cardinal principle of successful farming. And it's the slogan by which Loren Everett and his brother-in-law, Fred Algate, both of Mason, Mich., operate their farming partnership.

"We look for the easiest ways to do things and, if we can save money, we adopt the new practice," explained Everett. "That's how we decided on this new method of planting corn. It saves us time and cuts our costs."

The new planting system which Everett was referring to is that of planting corn directly behind the plow without additional seedbed preparation. He uses four Deere 23-B unit planters attached to a three-point-hitch tool bar. Each unit planter has a semi-pneumatic press wheel which firms a seedbed in front of the fertilizer shoe and seed runner. With the exception of these narrow seedbeds, the entire field remains in a freshly plowed condition. This narrow seedbed gives the corn a head start on the weeds and reduces the number of cultivations needed to control weeds.

Greenland has enough moisture locked up in ice to raise the level of all the oceans 24 or 25 feet.

Loren planted 160 acres of corn by this method in 1956 and his yield averaged between 80 and 90 bushels of shelled corn per acre. This was as good as, and in some cases better than corn yields made on neighboring

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fields where traditional corn planting methods were used. In 1957 Loren and Fred planted 200 acres of corn. They applied 200 pounds of 5-20-20 starter fertilizer in a band 2½ inches to one side and 1 inch below the seed where it would do the most good for the germinating corn plant. They're shooting for a plant population of 15,000 per acre.

Of course, the big advantage of this minimum tillage method of planting is the saving in number of times over the field. Everett figures he eliminated four trips over their fields by reducing cultivations and extra seedbed preperation. This not only lowered his planting costs from $5 to $1.50 per acre, but prevented extra compaction of the soil. The cost of two cultivations is also figured in this $1.50 cost per acre. In all, it is a system Loren and Fred think they'll stick with for several years to come.

Hybrid Cotton Now Possible

Discovery of a new technique for making some strains of cotton male sterile may offer the first practical means yet found for producing hybrid cottons. This report is from the U. S. Department of Agriculture and was announced by George W. Clark, extension agronomist for the University of Arizona.

Recent field trials by USDA and other cooperating scientists show that certain chemicals produced a no-pollen, male-sterile plant: one which cannot fertilize itself. If another variety of cotton is planted close by — a variety that is either not affected by the chemical spray, or is not sprayed to begin with — it can provide pollen to fertilize the male-sterile plants, and a hybrid cotton can be obtained.

Hybrid cottons themselves are not new. Plant breeders have produced many excellent crosses that show outstanding yield and quality characteristics. Such crosses, however, are usually obtained by hand-pollination in carefully controlled greenhouse experiments. The problem has been to find a practical way to produce these hybrids in the field. Large colonies of bees have been used experimentally to promote cross-pollination of cotton varieties, but the results could not be stabilized and controlled.

More research is needed, but tests indicate that, in the future, it will be economically feasible to produce a hybrid cotton seed.

—Arizona Farm News

Does Wheat Grower Have a Choice?

There's little hope for expansion of today's wheat allotments. Here's a report analyzing other opportunities in major wheat areas . . .

Condensed from
Massey-Hassis Farm Profit

Lee Schwanz

WHEAT growers numbed by years of drouth and acreage restrictions now face another affliction — tremendous stocks of their 2 best alternative crops, grain sorghum and barley. The grain sorghum crop was more than twice as large as a year ago while the barley harvest was 48% above average.

What to do with non-allotment acres again becomes a pressing problem, particularly for farmers in vast areas of the Great Plains and West where wheat is by far the best crop available.

We asked state colleges thruout this wheat region for their best "alternatives for the wheat grower." This article summarises their suggestions.

1. *Plant feed grains.* Most states have figures that show income comparisons for adapted crops. For example, Oklahoma tests show wheat returning $24.50 per acre with improved practices. Barley yields $21.33, oats $21.39, alfalfa $21.49, and grain sorghum $17.65. In addition, the oats and barley can furnish from $3 to $5 worth of grazing per acre.

The USDA has studies underway on cropping systems for the Central Plains. Preliminary figures show how several plans compare, using wheat-fallow as 100%.

Fallow-wheat-fallow-grain sorghum	91%
Fallow-wheat-sorghum	81%
Fallow-wheat-barley	66%
Fallow-wheat-proso	65%
Fallow-wheat-oats	20%

Barley and other feed grains are particularly strong alternatives because they use essentially the same equipment as is necessary for wheat. There's flexibility, too, since a farmer can hold off on barley seeding if it is too

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dry, then plant grain sorghum in the spring. Proso can be planted even later if moisture continues to be bad.

Facts About the Wheat Situation

America's wheat farmers can produce 50% more grain than can be sold at profit in this country and abroad. We need only 950 million bushels per year—and that amount can be grown on less than 50 million acres, or roughly the same acreage as harvested in 1957. Alternative crops are needed for millions of acres.

USDA and grain trade representatives, who have been studying the situation, conclude that the 30 million acre cut since 1953 will be permanent, barring emergencies. Allotments will continue at the present level and further slight cuts are a possibility.

Yields per acre are increasing as wheat is concentrated on the better land and more fertilizer is used. At the same time, Americans are eating less wheat. Export subsidies may not continue. It's a two-way squeeze that makes reduced acreage seem certain for many years to come.

Huge supplies of these grains will depress prices in the months ahead. But the support program should put a floor under prices. Stocks are not yet burdensome and it appears that another year of production at the present level would not cause great hardship. A new feed grain program will be considered in Congress next year, and the problem of the Great Plains grower will get full consideration.

2. *More livestock production.* Booming West Coast population offers opportunity for more livestock production. Distance gives producers in the West an advantage over the Corn Belt.

"Growing of feed grains and forage will be most profitable where they can be fed to livestock," observes Dean F. E. Price of Oregon State College. "Cattle fit best where there is enough range and water to handle volume to make modern methods pay. Hogs are best suited where range resources are limited and major emphasis can be placed on feed grain production. Hogs have another advantage in that size is less important and it is easy to shift in and out."

Hogs also are getting attention in Montana where a barley feeding study is underway. "But in some parts of our state, opportunities for shifting to livestock are not very great," reports Roy Huffman, Montana economist.

A. C. Magee, Texas economist, reports interest in more hogs as a way to utilize grain sorghums. The West needs more beef too and the downturn in the cattle cycle points to the possibility of some increase in production.

By returning low yielding wheat ground to permanent grass, many wheat growers would

have the basis for a small year-round beef cattle enterprise. Wheat and beef combine well together. Wheat offers winter grazing and little additional labor is required.

The first barbed wire was developed in 1873 by Joseph Glidden.

Oklahoma compared several different kinds of operations and found steers returned nearly 3 times as much as a cow-calf operation. Stocker-feeders were purchased in the fall and sold in the spring. Livestock appears to be a good bet for the farmer with consistent feed and water.

3. *Soil bank participation.* Although soil bank now is closed for 1958 crop winter wheat, this is a program that offers real opportunity for wheat growers. This is particularly true in areas where county committees assign a very liberal normal yield in figuring payments.

Payments have been increased; boosts are being considered for the future. Soil and water conservation practices on the soil bank land can earn ACP payments.

Special conditions that make the soil bank particularly attractive are (1) poor moisture conditions at seeding time; (2) opportunities for part-time work in town.

4. *Stretching the farm.* Irrigation and land purchase offer ways to make better use of machinery and labor. Most wheat farmers have equipment to handle their 1953 acreage; using it only on today's smaller allotment greatly increases the cost per acre. Buying additional land . . and its wheat allotment . . . offers a way to keep costs low and income high.

Irrigation is costly but it pays off in the high-risk plains where water is available. B. J. Bowlen, Kansas State economist, says many farmers find a $30,000 investment per quarter section is a good investment if wheat yield can be boosted 10 bu. per acre. Response of sorghum to irrigation usually is more profitable than wheat.

Feeding dairy cows large amounts of protein which they may not need is a waste of money, say dairy specialists. Extra protein can be used by the cow for energy but corn is a much cheaper source of energy.

These are some of the alternatives to replace the income lost by wheat restrictions. There's no easy solution that fits every farm. Choose the alternative that seems best for your soil, moisture and labor, then work toward it.

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Watch Beef Herd Wintering Costs

A big winter feed bill can eat up profits if cheap roughages aren't used in the ration.

Condensed from Wallace's Farmer

· *Neil Harl*

A BEEF COW must be fed properly through the winter to produce a vigorous calf in the spring. But while profits aren't made with starved cattle, they aren't made from cows wintered too well either.

One thing is certain for all beef herd owners—costs must be minimized if you are to enjoy a good margin of profits.

Wintering the herd is a big expense for the beef breeder. So consider how you can best use the roughage already on the farm.

"Hay is cheap this year," points out William Zmolek, Iowa State College beef specialist. "So this doesn't seem to be a good time to run up a big bill for supplementing low quality roughages."

Zmolek adds that it's easy to run up a bigger feed bill than good mixed hay will cost.

If you're short on hay, compare its cost with the cost of properly supplemented roughage material to determine the cheapest feed source.

How much feed will you need? This will vary with condition of the cows off pasture. And since pastures were generally good through the summer, most herds were in good flesh last fall.

The cow should gain the weight of the calf if she is in reasonably good flesh. That will be about 60 to 80 pounds. A mature animal will need about 1300 to 1500 pounds of total digestible feeds to do the job. About eight per cent should be digestible protein.

Grain is a fairly expensive source of nutrients for the beef cow. "My cows never see grain after they're turned out as heifers," declares F. R. Bennett, Union county, Iowa, beef man.

"And they don't see the inside of a shed during the winter, either. That's how I keep costs

Reprinted by permission from Wallace's Farmer and Iowa Homestead, Des Moines, Iowa

down on my herd," Bennett adds.

"We figure on a ton of oat straw and a ton of good hay for each cow," says a Kossuth county, Iowa farmer. "That along with an acre of brome-alfalfa pasture, takes care of them all year."

Nationally, the total acreage of cropland harvested in 1957 is about the same as in 1940. But the size of farms has risen about 40 per cent since then, and the output per farm is up 74 per cent.

If you have mixed clover and grass hay, 3200 pounds should do the job. But you can reduce the amount of hay to 1200 lbs. by feeding 500 lbs. of oat straw and 1500 lbs. of corn stover or corn stalks when available.

LaVerne Bahe of Buchanan county, Iowa, goes strong on hay and corn stover. Bahe runs the stover through a silo filler and feeds the cows all they'll clean up.

For silage feeders, 35 pounds of corn or sorghum silage and 8 pounds of legume hay per day will carry a cow to grass.

While this ration is a little more expensive, it will keep the cow in good condition. Thirty-five pounds of grass silage and 5 pounds of legume hay will meet the requirements.

Don and Frank Gibson of Clarke county, Iowa, are sold on grass silage for wintering the beef herd. They limit the amount of silage fed so the cows will clean out the corn and bean fields.

The heifer calves and yearlings should get the better quality hay and silage. Older cattle will use the coarser roughages best.

Special care for the herd sires will pay off. The bulls should be in strong, vigorous condition at breeding time. An overfat bull is sluggish, however, and may be a poor breeder.

Make sure salt and mineral are available to the cattle at all times. "I feed a 50-50 mix of salt and mineral including trace minerals," says Richard L. Alleman, Polk county, Iowa. "And I feed it loose to be sure they get enough."

An adequate water supply is mighty important, too. The animals are consuming large amounts of dry roughage and should get all the water they want.

Shelter is seldom a problem for commercial herds in Iowa. A windbreak, hedge row, or anything to break the wind is usually sufficient. But cows dropping January and February calves may need some extra attention in cold weather.

Signs of approaching calving are apparent. So remove the cow to a safe, sheltered place. Here the cow can take care of herself and the calf.

But you should check to see that the calf gets cleaned, dried, and on his feet. Once the calf gets a warm meal, he's a pretty hardy youngster.

Vitamin A deficiency may show up in herds on poor quality roughage. Stiffness, lameness, infertility, and poor eyesight are the usual symptoms. Better quality green, leafy hay should prevent vitamin A deficiency. Or you can feed a vitamin supplement.

First-calf heifers may need extra attention and assistance. And heavy milkers may have to be "milked out" until the calf can take it all.

Most cattlemen prefer to have later calves dropped on pasture. Disease problems are usually less away from buildings.

Many cattlemen think highly of painting the navel of the newborn calf with a disinfectant to prevent infection. This is more common for early calves born around buildings.

Frequent checks are still necessary to spot calving difficulties and to keep animals from endangering the life of the newborn calf. Hogs are common trouble makers here.

Blackleg may be controlled by vaccination. Animals treated at 4 months of age will generally be immune for 9 to 12 months or longer. This disease, primarily of younger cattle, is usually a pasture problem. But it has been known to attack cattle in pens.

To reduce labor costs, many commercial breeders like to feed the entire herd as a unit whenever possible. And they like to move the cows to the feed instead of the feed to the cows.

Feeding hay close to low quality roughages such as corn stalks will encourage greater consumption of these cheaper feeds. And this means greater profits.

Winter Good Time to Cut Timber

Winter is a good time to cut timber, because it will season more slowly with less cracking than during summer months.

The seasoning process counts a lot when it comes to getting top value from posts, poles, and logs. Insects and fungi which attack freshly cut wood are less active during the winter. If cut in the winter, the wood will be seasoned and less susceptible to damage by the time warm weather arrives. —*VPI Newsletter*

Coming: Sex Control in Cattle

For centuries breeders have tried to produce male or female progeny at choice. Now, success is in sight . . .

Condensed from Farmer and Stock Breeder

Manuel J. Gordon, Professor of Research at Michigan State University

THE economic advantages of a method of sex control to the dairy cattle industry are obvious. Not only would the dairy farmer benefit from the production of more heifers, but he would also gain in terms of the time lost in gestation resulting in a bull calf.

The beef cattle industry is interested in more bulls. Just as important, however, is the fact that herd improvement would be given a shot in the arm.

Sex control offers a genetic tool for applying selection pressures not attainable by other means. Until recently man's efforts to control the sex ratios in mammals have been unfruitful, even though a tremendous number of theories have been tested. Now, however, a distinct possibility for the successful predetermination of sex exists.

When rabbit semen was diluted with a salt solution, placed in a glass chamber, and an electric current applied, an interesting phenomenon took place. By looking into the interior of this glass chamber by means of a microscope, one could observe the movement of the sperm cells. Some of the sperm were seen to migrate toward the positive pole (anode), while others were moving toward the negative pole (cathode).

If the sperm were then collected separately from each pole and used for the artificial insemination of female rabbits the results were that anode-migrating sperm produced a preponderance of females, cathode-migrating sperm resulted in predominately male offspring.

Was this experiment the solution to the puzzle which had evaded man for centuries, the secret of sex control?

How it Works

The genetic mechanism of sex determination, in all mammals

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studied, is based upon "chromosomal complement differences." (The chromosomes are the carriers of the characters which are passed on from parent to offspring.) These complement differences are simply that females have two X-chromosomes (XX) while males have one X- plus one Y-chromosome (XY). Female ova thus contain only X, while male sperm contains either an X- or a Y-chromosome. It is, therefore, the male sex cell or sperm which determines the sex of the offspring.

People who claim they don't get all they deserve usually don't know how lucky they are.

X- and Y-bearing spermatozoa are presumably produced in equal numbers, so that it becomes a matter of chance which type of sperm cell will enter the ovum. Hence the sex ratio of organisms having this type of sex determination is predicted as 1:1.

Once this theory was established, sex control research was pursued in two main directions. One approach was to try selectively to destroy or to inactivate either the male- or the female-producing sperm. The other approach was to attempt to separate the two types and use them separately for fertilization.

Russian Results

From 1932 to 1939 a series of scientific articles coming from a Moscow laboratory contained such startling results that it was felt that independent duplication was of the utmost importance. This was the work of Dr. V. N. Schroder, who was the first person to utilize successfully an electric field for the separation of the two types of spermatozoa.

The phenomenon which occurs under the influence of the electric current is known as electrophoresis. The term has been used to describe the electric transport of particles in a liquid.

Sperm cells have a surrounding membrane composed of protein; and proteins have surface charges. The charge on the surface of proteins varies with the particular protein, and depends on whether the acidity of the solution is high or low. When low, they are negatively charged and are attracted to the positive pole; when high, they are positively charged and attracted to the negative pole.

What appears to be the case in rabbit spermatozoa is that the X-bearing (female-producing) sperm cells have a greater negative charge on the cell membrane than the Y-bearing (male-producing cells). By regulating the acidity of the dispersing fluid, it becomes possible to cause the ma-

jority of X-sperm to move to the anode while the majority of Y-sperm migrate to the cathode when an electric current is applied.

Our problem thus consisted of attempting to repeat as closely as possible the work of Dr. Schroder, who was able to control (with about 80 per cent accuracy) the sex of offspring of rabbits by artificially inseminating females with anode- and cathode-migrating spermatozoa separated by electrophoresis.

To date we have obtained 31 litters. These 31 litters resulted from 201 inseminations, which indicates the difficulties encountered with conception. (The conception rate has been markedly improved recently by depositing the semen in the uterine horns rather than the vaginal canal.)

While it is known that there were decided errors in technique in some cases, and suspected errors in other cases, all the data were analysed together to avoid any bias.

Results from Rabbits

The 31 litters consisted of 167 offspring. Of these 167 offspring 113 were of the predicted sex, giving an overall 67.7 per cent success. This can be subdivided into the number of successful predictions for males and females separately. There were 62 successes in 87 offspring, or 71.3 per cent for the females; and 51 successes in 80 offspring, or 63.7 per cent for the males.

In other words, the degrees of success for males and for females are fairly close, and they are both compatible with the total. These ratios could have occurred by chance only 2½ times out of 1,000,000.

No woman is likely ever to be elected President—they never reach the required legal age.

Of particular significance is the fact that of the 31 litters, seven of them were all of one sex. Every one of these unisexual litters was of the sex predicted.

New apparatus has been designed, and will be put into use shortly, to attempt to raise the percentage of success. Techniques and equipment will no doubt undergo a series of changes and refinements to improve results.

In the meantime, research is also being carried out to determine the properties of the sperm cell which permits the two types to be separated. This research consists mainly of physico-chemical investigations on the entire cell and on its various components.

Present Problem

Of greatest interest, at present, is the cell membrane. Some of our work indicates that the membranes on the two types of sperm cells are composed of different proteins. If this can be definitely established, we can account for the differences in migration in an electric field. We have definitely established that the internal contents of the two types of spermatozoa which are electrophoretically separable are quantitatively and qualitatively different in their protein constituents.

Within a very short time studies will also begin on bull sperm. The work will concentrate on trying to obtain a similar electrophoretic separation. Once separation is attained, the two fractions will be used separately to artificially inseminate cows.

How Long?

Many people wish to know when sex control will be worked out in cattle, and how long it will be before such a process can be used by industry. These are difficult questions to answer. One of the most difficult predictions to make in research is when a particular problem will be solved. The main point to be made here is that the answers exist and it is up to us to dig them out. The research advances sometimes excruciatingly slowly, s o m e t i m e s with breathtaking speed, but progress is a certainty as information accrues.

Alfalfa Vs. Alfalfa Silage

Cows prefer their alfalfa as hay rather than as silage.

A three-year study at Utah State University showed that cows consumed more nutrients, produced more milk and maintained their weight better when fed alfalfa as hay rather than as silage.

Researchers point out that interest in alfalfa silage has been stimulated by the difficulty of curing forage crops for hay where humidity and rainfall are high, also by the development of new harvesting machinery.

In the tests, researchers fed two groups of cows for 133 days. They fed alfalfa silage as the roughage to 16 animals, alfalfa hay to the other 16. Cows fed silage produced an average of 25 pounds of milk per day, those fed hay, 29 pounds per day. Moreover, cows on silage lost an average of 165 pounds in the 133 days of the test while those on hay lost only 7.5 pounds.

—*Utah State University*

What's In The Soil?

Ever stop to consider that a pinch of soil is a fascinating, complicated, lively world?

Condensed from Soil and Water

William R. Elder

TAKE a pinch of soil. Look at it. Smell it. Depending upon where you are, the soil may be black, brown, gray or yellowish brown. It may have a faint earthy smell. Unless an earthworm or ant bed is included, the soil looks dead.

A pinch of soil is a world in itself. Here is a mixture of living and dead, of organic and inorganic, of chemical and biological intermingling that makes the old question of animal, vegetable or mineral seem simple indeed.

First the soil has a part of its parent material represented in the fine particles of miniature rocks or sand grains which are but the crushed bits of the original rock. The clay particles with their vast surfaces which hold water and fertility are also but a few steps along the path of gradual breakdown of mineral material. These clays and sand grains make up the bulk of the soil we see.

But the chemistry of these sands and clays would fill a druggist's shelf. For here we find all the elements which put together make plant and animal bodies. Here are the "greats" — the bone building phosphorus and calcium, the all important potassium, plus the trace elements—iron, copper, zinc, boron, sulfur, and others. These elements can usually be found in mineral or salt form in the soil. In dry climates salts sometimes accumulate and become harmful to plants. Intermingled with the minerals and salts are the plant foods which have been used by plants or organisms before. Plant residues, roots, and dead organisms release their fertility for reuse upon decay. We call these dark colored materials or remains humus,

It takes a skunk two to three weeks to replace his "stinkum" — so he can't afford to get into trouble too often.

Reprinted from Soil and Water, 265 Texas Street, Fort Worth, Texas

and it makes up an important part of the soil. It is the binder, the filler which fits between the mineral particles and is the food for continuing organism growth.

But so far everything mentioned in the soil is dead! However, the soil, if productive, is a living, seething mass of activity. Obvious to the eye are the earthworms, ants, sow bugs, and other visible insects. Invisible is the host of bacteria, fungi, molds, and other microscopic life. Here are the biological workers that decay everything from wood to dead worms. Here are the workers that produce acids that dissolve solid rock. Fungi and molds, some of which have been isolated to make wonder-working drugs like penicillin, aeromycin and streptomycin are here doing their part in making the soil a living, going concern.

What else is in the soil? Probably the easiest thing to name, yet mostly overlooked is space to put air and water and plant roots. Room to house soil organisms and their food is also there. Framework for a factory that takes raw rock, old dead plants, air, water and heat, and supports the miracle of plant growth is present.

What's in the soil? It's a complicated world that sums up the happenings of the past — and holds the promise of the future productivity in its grasp.

Check Cattle for Lice

Cattle lice usually cause their worst damage during the winter when the cow's long, thick hair provides them with lots of protection. These pests rob animals of the ability to produce milk and meat efficiently and prevent normal growth.

But farmers don't have to take this loss sitting down, says F. M. Fuller, extension entomologist. Something can be done about it.

Lice may be controlled on beef cattle and non-lactating dairy animals by applying 0.5% toxaphene, 0.5% methoxychlor, .03% lindane, or .006% rotenone as either a spray or dip, or with .025% pyrethrin as a spray, points out Fuller. However, he warns, toxaphene should not be applied within four weeks of slaughter.

Lice on lactating dairy cattle may be controlled with 0.1% pyrethrin plus 1% piperonyl butoxide or with .006% rotenone. Either compound may be applied as a spray or dip.

The cattle should be checked two weeks after spraying, advises the entomologist. A repeat spraying may be necessary to kill any lice that may have escaped the first application or which have hatched since that time. —*Texas A & M College*

Antibodies in Milk Can Prevent Human Disease

Late report on research at Minnesota shows the mammary gland of the cow has remarkable abilities in the secretion of protective antibodies . . .

Condensed from Certified Milk

HERE'S a late report on the use of milk to control disease in humans.

Further advances in the studies of utilizing cows' milk as a means of protecting people from disease were reported at the November annual meeting of the American Public Health Association, by Dr. Berry Campbell and Dr. William E. Petersen of the University of Minnesota.

The scientists, three years ago, reported that a cow's udder is capable of creating very large amounts of antibodies. The new studies show how drinking a quart of milk a day, which contains very high levels of specific antibodies, can enable adults to accumulate gradually an antibody level in the blood to relieve symptoms of hay fever, asthma, colds and eye itching.

Vaccine Injection

The Minnesota researchers reported that milk from a single cow could be stimulated by direct injection of vaccines to contain large amounts of a number of different antibodies. This finding, they said, suggests that cows' milk in the future may be valued for its disease-protecting power rather than its butterfat. Injection techniques are not more difficult than routine steps in dairy farming now, they said.

Doctors Campbell and Peterson also reviewed the history of immune milk, a subject they said is not young. They reviewed experiments which began 60 years ago with a transmission of antibodies through milk by Paul Ehrlich, studies by Felix Klemperer, Emil von Behring, Famulener and Rockefeller Institute papers from the laboratories of Theobald Smith, R. B. Little, M. D. Orcutt, and P. E. Howe.

"We propose that the contribution of the cow to human welfare may be greatly extended through utilization of the new

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findings in the field of milk antibodies," the report declared.

"The phenomena which form the basis of this view are as follows: In milk as in blood serum, there is a globulin fraction which is rich in specific antibodies. Chemically, there seems to be no difference between the so-called lactoglobulins and the globulins which represent the immune fractions of the blood. These immune globulins of the milk are secreted, for the most part, in the mammary gland itself which contains large amounts of lymphoid tissue. With respect to this function, the mammary gland may properly be described as an exocrine reticuloendothelial gland.

"The spectrum of immunity which one finds in the milk corresponds to the immunological history of the particular cow, in the same way as do the serum antibodies of each individual. In general, they are found to represent the various pathogens of the cow and it has been known since the work of Theobald Smith, that they serve the natural function of immunizing the calf at the time its own antibody forming tissue is inadequate. So great is the dependence of the calf on this maternal source of immunity that only under special circumstance can calves be raised without the early milk.

"As these antibodies are secreted in the mammary gland itself, they may best be stimulated by direct application of antigens. Immunization of the cow's udder may most effectively be accomplished by the direct injection of the vaccines into the teat canal. In this way they quickly pass into the secretory tissue and elicit the production of specific antibodies. Thus, the antibody content of the milk may be raised to levels higher than can be accomplished by subcutaneous or intramuscular infection of the cow and the production is much more prompt. We have shown that by these means milk may be produced with very high levels of specific antibodies to antigens which are not normal to the cow's environment. The organisms of human virus and bacterial diseases are as effective in this respect as those of diseases usually associated with the cow.

Adult Immunity

"In addition to these experiments on animals we have made a number of observations on the uptake of immunity by human adults. In these, we and our graduate students have served as "guinea pigs." An example of the observations will serve here. An adult man drank milk from a cow immunized with a polyvalent Streptococcus, type A, vaccine. The titer of the milk

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was 1:1000 dilution in plate agglutination test. The rate of milk drinking was one liter per day. His serum, previously negative, showed agglutinating antibodies in five days. These continued to increase until a plateau was reached at 1:56 by the nineteenth day.

"Little can be said at this time about the economic aspects of this matter. It is obvious that the immunization of the cows will increase production costs. The manipulation involved requires a skill of the same order as that of artificial insemination. The effect on consumer prices cannot be predicted without an exhaustive survey into the ultimate effect such a departure would have on consumer demand. One might hope that much of the additional cost would be balanced by increased consumption.

"In a very real sense, the science of nutrition acquires a new dimension through the operation of these principles. Though the aim of the nutritionist has been not only to maintain the energy balance of man in the proper relation to expenditure but also to regulate the diet to the point where the health of the individual is most easily maintained, the appreciation of the place that milk transmitted immunity plays in the natural order of things and especially the potential which scientifically immunized milk offers has the effect of emphasizing the importance of the nutritionist in the front ranks of those who guard the public health.

Patience will accomplish most anything. In fact, you can even carry water in a sieve, if you wait until it freezes.

Points Involved

"We would like to end with a brief recapitulation of the points involved. Recent findings have shown that the mammary gland has remarkable abilities in the secretion of protective antibody. It appears that this is an essential mechanism in the maternal-offspring relationship of mammals. Realization of the local production of the immune bodies in the gland has led to the technique of evoking, through mammary infusion, large scale secretion of specific antibodies and of the production of immune milk. Passive immunity to bacterial and other diseases may be achieved by ingestion of such milk and thus the essential function of the mammary gland may be extended and utilized as a public health measure for the prevention of human disease. The economic and sociological implications of these findings are examined."

Wean All Pigs You Farrow

If you do, you make a big difference in your profits . . .

Condensed from Prairie Farmer

WEANING all the pigs you farrow is an easy way to increase your profits in the hog business. With good management practices on baby pigs, profits can be increased.

Before the sow farrows, feed gestation rations which contain enough protein, minerals, vitamins, and other nutrients needed for good pigs at birth. S. W. Terrill, head of the swine division at the University of Illinois, says that these rations should be started before mating and continue through the gestation period.

One example of such a ration is 3.5 parts ground alfalfa hay, 5 parts ground earcorn, and 1.5 parts sow supplement.

Feed a bulky, somewhat laxative ration the week before and the week after farrowing. Reduce the ration to about half the normal rate on the date the sow is to farrow. An example of a laxative ration would be 3 parts ground corn, 3 parts ground oats, 3 parts wheat bran, and 1 part sow supplement.

Losing pigs during farrowing or soon after can become expensive. The cost of a pig at farrowing is around $2.25. To cut down loss by crushing, provide a pen for the sow and litter that has a clear floor area 6 by 6 or 6 by 7 feet. Large sows may need more area.

Guard rails help protect the baby pigs from being crushed against the wall. Rails should project about 8 inches from the wall and about 8 inches above the floor. If possible provide heat for the pigs.

Farrowing stalls help cut down the crushing losses and also save space. The area for a farrowing stall is 5 by 7 to 8 feet, including the area for the baby pigs. Stalls also reduce the activity of the sow.

As soon as the pigs are born, daub the navel stub with tincture of iodine to prevent any navel infection. Needle teeth do not

Reprinted by permission from Prairie Farmer, 1230 Washington Blvd., Chicago 7, Illinois

need to be cut unless the pigs start fighting. If the needle teeth are cut, care must be taken to avoid injuring the gums.

Weak or chilled baby pigs should be removed from the litter and given 1 or 2 teaspoons of corn syrup diluted with 2 parts of water once every 2 to to 3 hours. Supply heat for these pigs. While pigs are small litters can be evened up by transferring pigs from large litters to smaller ones.

The United States murder rate was 5.8 per 100,000 population in 1934—In 1954, it was 1.9 per 100,000.

To prevent anemia in pigs kept on concrete or wood floors, Terrill recommends swabbing the sow's udder with a saturated copperas solution (1 pound of copperas in 3 quarts of water).

Another way to prevent anemia is by sprinkling the copperas solution on a chunk of uncontaminated sod. Keep the sod where pigs will root at it. Start treating for anemia prevention before the pigs are one week old.

Anemia can be prevented by catching each pig and giving him an iron pill or a "squirt" of copperas solution once or twice a week for the first 3 weeks or longer.

Creep-feed a pig pre-starter and starter ration from birth to 8 weeks. To get pigs to start eating early, feed a palatable pre-starter ration. After 4 to 6 weeks, when the pigs have learned to eat the pre-starter ration, begin a gradual shift to the regular starter ration.

If you give dandelions an inch, they'll take a yard.

Pigs should be weaned by the time they are 8 weeks old. Those that eat well and weigh 20 pounds can be weaned at 5 weeks. With careful management and an excellent pre-starter, pigs weighing 10 pounds can be weaned at 3 weeks of age.

Castrate boar pigs at 2 to 4 weeks or earlier. Vaccinate for cholera at 4 to 6 weeks. Other management practices include spraying sows and pigs with lindane or benzene hexachloride solution to control lice and mange. Treat wormy pigs with a sodium fluoride feed mixture.

After the sow farrows, take your time in getting her back on full feed. Increase the ration a little every other day. In about 2 weeks she should be getting all she will eat. Swollen udders of sows and scouring of pigs indicate that the sow's ration should be cut. A heavy milk producer suckling only a few pigs may run into trouble.

Sows that eat their litters may be undernourished, just mean, or they may be frightened or in pain. To avoid losing pigs from this cause, feed sows plenty of well-balanced rations during gestation. Stay close-by at farrowing time. Remove pigs if the sow shows any sign of wanting to destroy them. Return them to her for nursing every two or three hours. In a day or so she probably will quiet down and accept them. Keep farrowing pen clean and well bedded. Remove the afterbirth before the sow has a chance to eat it.

New Use for Corn

Corn is a kingpin in the production and raising of all our four-footed domestic animals. Now it has stepped into the picture as a tanning agent to help turn their hides into new and superior types of leather.

Dialdehyde starch, a new corn product developed by U.S.D.A. researchers, shows great promise for production of garment and glove leathers with unique properties. Cooperative work with commercial tanners is already under way.

We now are completely dependent on other countries for tanning agents, importing about 240 million pounds a year. Chrome ore, the source of a chrome chemical universally used to tan light leathers for the upper part of shoes, is imported from Africa and other parts of the world. Vegetable tannins from bark and wood, for tanning shoe soles and upholstery, come from South America, Africa, France, and Italy.

A tanning agent from a domestic crop that is always available and frequently in surplus would offer definite economic advantages. But, in addition, it opens up some new possibilities for leather use.

First, it makes an off-white leather, easier to dye into pastel shades for women's wardrobes than chrome-tanned blue leather. Then, too, dialdehyde-starch-tanned leather can be washed in mildly alkaline solutions, such as soapy water, without losing its tanning and drying hard and bony. Used in test combinations with other tanning agents, the dialdehyde starch is also showing resistance to perspiration, another obvious advantage.

—West Virginia University

New One Year Rotation: Hay to Corn . . . to Hay

An amazing short rotation produces more TDN per acre, yet cuts soil losses 50%.

Condensed from Successful Farming

T. L. Wainscott

HERE'S probably the latest minimum tillage idea to date. Actually, it's a combination of wheel-track planting and wide-row corn. The practice has been tested at the Soil and Water Conservation Experiment Station, LaCrosse, Wisconsin.

June 12, Make Hay

Alfalfa-brome is cut, put through a crusher at once, and into barn for artificial drying. It could be cut earlier for grass silage.

June 14, Wheel-Track Plant Corn

Start plowing just as soon as hay is off field. Here a mounted "2-way" plow turned the soil up the slope, eliminated dead furrows and back furrows in the field. Planting the same day soil is plowed is best. Plow is never far ahead of planter. On some soils, planting a day or two after plowing has produced good stands.

Planting tractor wheels, planter wheels and shoes, are all set out to 56-inch centers. Corn is planted in wheel tracks made in the freshly plowed ground.

July 12, Band-Seed Alfalfa

Seeding goes between the rows of corn. Plants are 15 to 20 inches high. The corn has had only one cultivation, when about 8 inches tall. Now a pair of 12-inch sweeps stirs up the soil ahead of tractor wheels to kill weeds and loosen seedbed for alfalfa. The drill is tractor-mounted. Pull-type drills can be used. Important point here is use of packing wheels which firm soil around the small seed, assure good contact with soil moisture.

Compartments in the fertilizer hopper hold plant food for band-seeding, and dry nitrogen to side-dress the corn row while seeding.

September 3, The Payoff

The 90-day corn is now dented, with an alfalfa seeding established between the rows.

Business farmers realize that the year it takes to establish a

Reprinted by permission from Successful Farming, Des Moines, Iowa

seeding under a nurse crop, the land is coasting. Corn and hay are the most important crops in livestock farming. They produce more than twice as many TDN as small grain. Combining wheel-track planting with wide-row corn makes it possible to produce more of these crops in a shorter time. The small grain is dropped.

About 15,000 people in India die yearly from snake bites; some 10 to 15 in U.S.

The system has been tried and worked out for 3 years at the LaCrosse Station. Making the first cutting of hay around June 10 has yielded about 1.25 tons per acre. It is possible to make this cut earlier if desired. An earlier cut will normally reduce hay yields, but increase the yields of the corn crop. Getting the hay off the field in grass silage, or into artificial drying, not only saves time but cuts down the losses in field drying.

Following the hay harvest, a good job of plowing is important. The plow should be adjusted to turn over the plow layer uniformly so that all vegetation is well covered with openings between furrows. Even back furrows and dead furrows in the field should be eliminated to make a smooth hayfield. A 2-way plow, used on slopes, throws all furrow slices uphill.

Planting the corn in wheel tracks directly on the plowed ground should follow as soon as possible after plowing. Moisture in the furrow slice aids corn germination. The tractor wheels firm the soil and prepare the corn seedbed. Extending the tractor wheels and the planter to 56″ centers means that the rows of corn will be planted 56 inches apart, compared to the normal 40-inch rows.

A pre-emergence weed spray at planting time is probably advisable in very weedy fields. It should be sprayed in a band over the wheel tracks.

An early maturing corn, 85- or 90-day variety, is planted. The rate of planting and the rate of starter fertilizer per acre should be the same as used in narrow-spaced rows. However, with the rows further apart, the number of plants *per row* must be increased. In the experiments in this article the corn was planted at 18,000 kernels per acre. In these rows it means a plant about every 5 inches.

The first cultivation of the corn is made when plants are 6 to 8 inches high. Most of the weeds will be in the row. These weeds should be covered, but ridging in the corn row must be minimized to produce a smooth hayfield.

Normally, two cultivations will control weeds with wheel-track planting when corn follows hay. However, control of weeds is essential to a successful seeding. In extreme cases, therefore, more than two cultivations may be required.

Henry Burton, who invented a machine to make horseshoes, realized a profit of $1,000,000.

The legume seeding is made when corn is 15 to 20 inches tall, and weed growth has been controlled. Since surface soil is usually dry when the corn has reached this height, special packing equipment should be used to ensure a good stand of legumes. Stirring the soil with sweeps helps make a seedbed.

Two types of machines have been used successfully in interseeding — a grain drill with attached packing wheels, and a cultipacker seeder. The grain drill should be of a high-clearance type and adjusted to the corn. The cultipacker must be of a design that will seed between corn rows without damaging the corn.

With either unit, better stands are obtained if the seeding unit is arranged so the legume seed is spread as far into the corn row as possible. Fertility is important in establishing the legumes. Kinds and amounts of seed and fertilizer are normally the same as when seeding legumes with a cover of small grain.

Weed control is a must if the seeding is to survive. Mowers are available which can be powered by a small tractor capable of clipping between the corn rows. Care should be taken not to clip the legume seedlings. Chemical controls of weeds are just around the corner. New herbicides are under study, which when perfected, will be able to control both broadleaf and grassy weeds without injuring either the corn or the legumes.

A cord of good wood will produce as much heat as a ton of soft coal.

The corn should be harvested by equipment which removes both ears and stalks from the field. Machines are now on the market which will do this in one operation. Yields at LaCrosse have averaged 74 bushels per acre using the early maturing varieties. The corn stubble rots down and the mower goes over the top of it. The small ridges left in the fields do not hinder haying operations.

There are several obvious advantages to this hay-corn-hay rotation. In addition to eliminating the questionable small-

grain crop, the protection given soil is of great importance. The field is protected by hay until mid-June. The wheel-track planting leaves the soil in a highly absorptive condition until cultivation. Rains have an opportunity to soak in. Then a good, dense cover is growing between the corn rows by early August. The land is out of hay only about 2 months!

This hay-corn-hay rotation is an excellent erosion-control system on slopes up to 16 per cent. It allows the land to be in corn more of the time than most erosion-control rotations advocated up to now. Soil losses from hay, corn, and hay are less than ½ as much as from corn, grain, and hay rotation. Research at the LaCrosse conservation experiment station shows that small grain land allows twice as much runoff and 2½ times as much soil loss as corn following hay.

Seedings in corn have produced stands of alfalfa and brome which yielded within 0.2 ton as much hay as seeding of alfalfa-brome made in small grain. Even if you *do* lose the seeding, all you have actually lost is your seed. The fertilizer is still there, you can still make a seeding in small grain the following spring after the corn is off.

In a normal year, this interseeding in wide-row wheel-track corn will put you *a whole year* ahead of a regular rotation.

Our Friend, the Cow, by a Brazilian Tot

From an essay by a Brazilian third grader printed in O Estado de Sao Paulo

The cow is a domestic mammal. It has six sides. Top, bottom, right, left, front and back.

In front is the head. It has horns where there is room for the mouth. The cow is covered with cowhide. Underneath it has a box of milk, it's made for pulling, nobody knows how the cow does it.

The cow also makes a calf every year. Nobody knows how she makes it.

The cow smells good, you can smell it from far off. That makes the smell of the country.

The cow eats potatoes and grass, and the calf eats macaroni. When the food is good the milk is good but when the food is bad the cow's milk is bad. When it thunders it's sour. That's all I know about the cow.

Feed is Key to 1958 Livestock Profits

Here's a well-reasoned forecast of livestock prices and prospects for 1958 . .

Condensed from
National Live Stock Producer

H. M. Conway

RECORD feed supplies will dominate the live stock situation through 1958.

Feed is the raw material for meat production. It should be remembered that "corn is pork in process." When this old saying is applied to beef cattle, it could be amended to "corn and roughage is beef in process."

Ample feed supplies coincident with reduced live stock numbers have created favorable feeding ratios and relatively high prices for live stock. Live stock numbers are being increased, however, in order to take advantage of large supplies of low priced feed. This adjustment has reduced current meat production which in turn forces live stock prices higher. This basic self-supporting cycle has created considerable optimism throughout the live stock industry.

This major adjustment in the livestock industry comes at a time of a general industrial slow-up. And when business pulls in its horns, it means a less favorable demand outlet for live stock and meat products. There is a serious possibility, also, of price deflation.

Prices Reflect Disparity

These factors *justify and call for more conservative* live stock production and feeding policies throughout 1958.

Live stock prices still reflect the extreme disparity against agriculture. As of last November, beef cattle prices were only 79% of parity, hogs 76% and lambs 80%. In contrast, corn prices for that month were 55% and grain sorghums 54% of parity. Although all agricultural values are below parity, feed crop prices are such as to result in very favorable feeding ratios.

The increased supply of feed is generally attributed to favorable weather conditions but basically it is the result of lower production costs. Eventually the price of live stock and feed will

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tend to balance and this means that live stock values will come down more in line with the cost of feed production. When this happens both crops and live stock will be more in line with the overall agricultural disparity. At present this is about 81% of parity but the potential exists for a much lower level.

U. S. cotton production of 11,010,000 bales of 500 lbs. gross weight is estimated by the Crop Reporting Board. This is 2,300,000 bales less than the 1956 production and the smallest crop since 1950.

Such a situation will not be solved by crop controls, soil banks and other legislative programs. The country has the potential for unlimited production provided it can be accomplished on a profitable basis. The legislative approach, even though successful with feed crops, forces basic adjustment in live stock. Then the production and feeding of live stock gets out of line with the demand for meat.

Price supports have become less dependable this year as a yardstick for measuring feed prices because most feeds are on a supply and demand basis, especially those feeds that cannot meet storage requirements.

Strong Demand for Feeders

This has put live stock feeding and producing programs on a lower cost basis and created an unusually strong demand for stockers and feeders. As a result, stocker and feeder prices are on a much higher level than for the past two years.

The maximum volume of fed cattle is expected to be marketed in April—indicating a delay in the traditional February break in cattle prices. During the past three months there has been an increased number and proportion of fleshy feeders moving into feedlots. Also, a more normal supply of fed cattle is being produced in the Southwest.

Winter grazing will be extra favorable and with an abundant production of row crops, the supply of Wheat Pasture cattle for March and April markets should be normal.

Regardless of official estimates as to the number of cattle on feed, there are basically as many fat cattle in prospect now as compared with a year ago and they are primarily bunched for the first half of the feeding season. The major reduction in cattle feeding will be calves and light yearlings, particularly grain fed cattle, to be marketed during the summer and early fall.

Hog Numbers Are Increasing

The hog cycle is on a definite uptrend and hog production is being definitely stimulated. After an early topping out, the remainder of the spring pig crop should be in strong hands. Hogs were held to clean up corn fields and utilize a large supply of soft corn. The net result will be heavier weights and a shift in seasonal marketings.

Slack farm season in winter is often the best time to trim the feet of herd bulls, dehorn cattle or remove tusks from boars.

It seems advisable to defer marketing of fall pigs into midspring or later. There will be another seasonal shortage of hogs during the late spring and early summer. The summer outlook for hogs is favorable but hogs will run into some trouble in the late fall.

Supply and demand conditions last fall gave added support to lamb values. Since last July, the supply of lambs has been less than a year ago; wool prices have been higher, and there has been less competition from pork and beef. Reduced lamb slaughter reflects a moderate reduction in the lamb crop and the holding of ewe lambs and accumulation in feeding areas.

The fed lamb crop, however, is expected to be less than a year ago. Early fed lambs should be topped out closely, especially the advance movement into the Northwestern Corn Belt and into Western feeding areas.

Feeder lambs are carrying more weight because of ample feed supplies in all areas. Apparently there will be some bunching of the fed lamb crop for January and February. Normal supplies are expected for May and June, including yearlings and more Southerns and early Natives. Lambs seem well protected by reduced imports and high foreign markets for wool and mutton.

The opossum is called a living fossil, because the species dates back some 80 million years, and has changed very little in all that time.

Agriculture has been under extreme economic pressure for several years now. Farmers and stockmen must adopt more efficient and economical methods of production just to make ends meet. This normally takes the form of increased volume with more emphasis on reducing costs. If this seems impossible, the farmer throws in the sponge and goes off to the city for employment.

Credit Has Been Eased

The national economy has been pushed into a very precarious position. The long standing cheap-money policy has run its course, despite the temporary easing of current credit restrictions. It is hard to conceive of any further price inflation—and more important, it is hard to conceive any further increase in the per capita demand for meat.

There are 28,000 different known species of birds.

The self-support which has generated ohms of optimism in the live stock industry may be short-circuited by next spring and not later than the following fall.

Agricultural disparity is a chronic undermining force of the entire national economy and nothing is being done to correct the situation. Regardless of farm programs and national policies there is a net accumulation against agriculture which is now being shifted to the live stock industry.

The consumer is loaded with debt and mortgaged to the future. The cost of living will not come down when consumer income is reduced. In case of a major depression, all forms of social security and other so-called built-in economic stabilizers will mean very little.

Scientists Learn How Cow Makes Sugar

Dairy scientists at the University of Minnesota have learned in minute detail how the cow makes milk sugar in her udder. This is the first time the process has ever been thoroughly understood.

The scientists have successfully made lactose, or milk sugar, outside the cow's udder, by using blood sugar and enzymes from udder tissues. More than a dozen enzymes are involved in the process. They "tagged" the blood sugar with radioactive carbon. Then, with a Geiger counter, traced the process until milk sugar was made. The radioactive technique allowed them to find out just which enzymes and which other compounds were involved in the process.

While this finding has no immediate application, it gives researchers a better idea of what goes on inside the cow's udder in making milk. They point out that the hormone oxytocin was first discovered in the 1920s. Yet, it was more than 10 years after before researchers found that this same hormone is responsible for milk let-down.

—Minnesota Extension

Over-Eating in Feeder Lambs

Vaccine alone cannot prevent over-eating disease — good management also is required . . .

Condensed from
Colorado Farm and Home Research

OVER-EATING in humans merely causes a tummyache. With feeder lambs, it often is fatal.

A vaccine is one of the two effective weapons the sheepman has in preventing loss of lambs from over-eating. The other weapon is good management.

Dr. Lynn Griner, associate pathologist for the Colorado Agricultural Experiment Station, said lambs should be vaccinated about a week or ten days after they are brought into the feedlot. It should be done before the lambs are placed on a concentrated ration.

Dr. Griner emphasized that the vaccine should be given in a professional manner to avoid complications. Feedlot operators should consult their local veterinarians first. In many cases, it is best to have the veterinarians vaccinate the sheep, he said.

If the vaccine is administered carelessly, a few wool fibers might be introduced into the tissues along with the needle. This may cause an abcess to develop, which could mean financial loss. It is even possible the abcess will prevent the vaccine from building a high degree of immunity.

Over-eating disease, or enterotoxemia, is caused by a bacterial poison that develops in the intestine. It generally occurs when lambs are placed on a fattening ration, which they eat in excess of their normal needs.

Up to 30 per cent can be added to the life of farm machinery by giving it proper winter care.

Indigestion sets in, and an acid condition develops in the stomach. The feeds are carried into the intestine as undigested feed. Under this condition, bacteria grow rapidly, producing a highly toxic substance that causes death.

Reprinted from Colorado Farm and Home Research, Colorado State University, Fort Collins, Colo.

Most of the time, the disease progresses so fast that symptoms are not observed. Usually the lambs are simply found dead in the feedlot.

Unofficial record temperature in the shade in Death Valley is 137 degrees.

"Vaccine alone cannot prevent over-eating disease — good management practices are also required," Dr. Griner stressed.

The vaccine is not always 100 per cent effective, but it is effective to a high degree when used correctly and when proper management practices are followed.

Vaccinating lambs for this disease is an excellent example of preventive medicine. It must be done while lambs are healthy. There is no known cure once the disease strikes.

All-in-one Silages Appear Promising

All-in-one silages appear promising for winter feeding of beef cattle.

George Mitchell, assistant professor at the University of Illinois, says preliminary experiments with corn, oat and alfalfa silages show that it might be possible to ensile them as complete rations for beef cattle.

Mitchell points out that 40 per cent of ground corn added when the silo is filled will provide all the corn needed for a fattening ration. Also, adding a high percentage of preservatives reduces nutrient loss due to fermentation.

Feeding minerals free choice plus two pounds of dry roughage per head daily with silages containing corn preservatives provides a well-balanced ration. However, research is still needed to learn more about silage fermentation processes.

According to Mitchell, cattle fed the all-in-one silage in recent experiments gained more quickly and graded slightly higher than cattle fed ordinary silage and grain separately. Also, feed and labor expense was greatly reduced.

Silage can be fed in many different ways. But Mitchell points out that using automatic equipment to feed large numbers of cattle requires less labor and allows more time for other farm chores.

—Illinois Extension

Concentrates Cut Poultry Costs

Concentrates plus home grains, ground and mixed with a meter mill, cut feed costs . . .

Condensed from Hoard's Dairyman

Joe W. Sicer

"I HAVE my own corn and oats. How can I best use them in mixing my own laying ration?"

This is a question which many poultrymen are pondering today.

Feed is easily the biggest single cost in producing eggs, and also the biggest cost in growing broilers. Grain is a large percentage of all commercial poultry feeds, except high protein concentrates.

Why not take advantage of your own or locally grown grain, use it along with a concentrate, and trim down that feed cost?

With layers, one of the simplest ways of using an abundance of grain is to hopper feed shelled corn, oats, and a laying supplement containing about 26 per cent protein. When controlled, this method of feeding gives reasonably good success. Some flocks, however, will tend to eat too much grain in proportion to the amount of supplement eaten. This is especially true of heavy breeds but often happens with Leghorns, too.

In order to have the overall ration supply an average of 15 to 16 per cent protein, the consumption of the grain must be gauged so not more than 200 pounds of the grain (total) is eaten for every 100 pounds of the 26 per cent supplement.

Usually this method of cafeteria feeding works best if it is supplemented once daily with a light feeding of condensed milk or laying pellets. Use about 2½ pounds of the milk fed in paste form, or about 2 pounds of pellets per 100 birds.

One drawback to this free-choice feeding is that it often leads to cannibalism. The birds can quickly satisfy their appetites, have nothing else to do to keep themselves busy and, hence, get into mischief.

Reprinted by permission from Hoard's Dairyman, Fort Atkinson, Wisconsin

You may prefer to grind your grain and use it with a concentrate to make a mash. In doing this the temptation is always to use too much of the relatively inexpensive grain in proportion to the higher priced concentrate. The correct amount of grain to use will depend on the concentrate.

Baby pig anemia is becoming an increased problem. It results from not enough iron in the diet. Swine specialists say additional iron can be supplied from mineral soil, iron tablets or iron injections.

Be guided first by the recommendations of the manufacturer. In the absence of the manufacturer's recommendations, here are some principles to keep in mind:

To make a 20 per cent protein mash, such as is used with hand-fed grain, the following proportions of concentrate and ground grains may be used.

Protein in concentrate %	Concentrate lbs.	Ground grain lbs.
26	100	25 corn 25 oats
32	100	75 corn 50 oats
40	100	100 corn 100 oats

The amounts are examples only.

Protein content is not the only determining factor. What really counts is the amount of all nutritional factors in the final ration which the hen eats.

What would happen if you used 100 pounds of ground corn, 100 pounds of ground oats, and 100 pounds of a 26 per cent supplement? You would have a mash that contained just a bit over 15 per cent protein. It would probably be good as an all-mash ration; however, if you fed any grain with it, you could not expect high egg production.

All-mash rations are growing in popularity. They eliminate the need to watch the proportion of grain and mash eaten. They give assurance the bird is getting a complete ration in every mouthful, as well as provide a more uniform yolk color.

Do not think it is always economical to use the concentrate with the highest protein content. Concentrates with more than 34 per cent protein normally must be compounded from meat scraps or fish meal, which usually are more expensive sources of protein than soybean oil meal. Fewer pounds of the high protein concentrate will be needed but the final cost may be higher.

Mills Potential Savers . . .

In some cases, one objection to using your own ground grains and concentrate is the incon-

venience. It takes quite a bit of time to haul your grain to town, wait for it to be ground and mixed, and then haul the resulting feed home.

One of the most interesting pieces of equipment which holds great possibilities for cutting feed costs is the comparatively new mixing mill. These mills are small hammer mills with four metering devices so arranged that four different kinds of ingredients can be metered fairly accurately into the mill at one time and come out thoroughly ground and mixed together. You could meter in shelled corn, oats, concentrate, and, if desired, a premix of a feed medicament or antibiotic.

The capacity of such mills is just over a half ton an hour, but their operating cost is only around 9 to 10 cents per ton for mixing and grinding when the electricity rate is 2 cents per kilowatt hour. Set up with overhead bins for ingredients, you can start the mill running and go away.

According to reports from a number of Midwest poultrymen who have been using them, the cost of the mill and overhead bins runs under $1,000. The mills have been quite dependable. It is essential, however, that the corn used be good No. 2 corn.

Some operators report as much as $10 per ton savings in feed cost in using the mill with local grains and concentrate. At that rate, a flock of 1,000 hens could pay back the investment in two years. A broiler plant with 10,000 capacity, would need only six months to repay the investment. And most farms could use the mill for other livestock feeds.

Strong Demand Seen for Lambs in 1958

A strong demand for lambs for slaughter, as well as for replacement stock, is in prospect for 1958, say agricultural economists.

Prices should stay close to the 1957 level regardless of any probable increase in lamb production, and all indications point to higher prices.

The economists say the downward trend in sheep numbers may have reached its end. The nation's farms had 26,400,000 sheep at the beginning of 1957, or about 700,000 fewer than in the previous year. Unfavorable pasture and range conditions in certain areas seem to be the major cause for the continuing reduction in sheep.

Now with ewe lambs being held back and purchasing for restocking, it is estimated that the number of sheep on farms January 1, 1958, may be slightly larger. An increase is expected in the 1958 lamb crop. —*Virginia Extension*

How to Control the Alfalfa Weevil

Granulated insecticides applied in winter or early spring on frozen alfalfa fields overcome many disadvantages of spraying . . .

South Dakota Farm and Home Research

Ernest J. Hugghins, South Dakota Associate Entomologist

YOU CAN control alfalfa weevils as effectively with granulated insecticides as with sprays and at the same time overcome many of the disadvantages of using a field sprayer in the early spring.

Damage by the alfalfa weevil, *Hypera postica* (Gyll.), in western South Dakota has made the application of chemical controls a regular spring practice in heavily infested areas. While some insecticides in the spray form have provided good control, you have to wait until temperatures are above freezing to use a sprayer. This may crowd your other spring work. Also, if you use a weed sprayer to apply insecticides to alfalfa you must be extremely cautious and thorough when cleaning weed killer from the sprayer to avoid injuring your alfalfa stand.

Since granulated insecticides have been successful in controlling other insects, including corn rootworm, European corn borer, meadow spittlebug, and seed weevils on crimson clover, we started a trial to test this type of application for alfalfa weevil control as a way to overcome some of the drawbacks of spraying.

Compare Two Methods

In our experiments we compared the effectiveness of granulated heptachlor and dieldrin formulated on attaclay applied in late winter and early spring for the control of the alfalfa weevil. Two alfalfa fields were used in the trial—one in Butte and one in Lawrence County.

Each field was laid out in randomized complete blocks with three replications. Individual plots were 1 acre in size.

Granulated insecticides were applied at rates of one-fourth and one-half pound of actual insecticide per acre. The spray was applied in the emulsion form at the rate of one-fourth pound of actual insecticide per acre, using

Reprinted from South Dakota Farm and Home Research, College Station, Brookings, S. Dakota

the same chemicals as in the granulated form.

On the William Schuft farm in Butte County, 21 acres of an alfalfa field which had not been treated in 1955 were used in one part of the trial. Granulated insecticides were applied March 16. The temperature was 27° F. and there was a snow cover of 1 to 2 inches on the field. The spray was applied April 17 when plant growth averaged about 1 inch.

Because of the late spring, larval damage was just beginning to appear June 11 at the one-fourth bloom stage. Since most of the larvae were in the second or third stage of development, we estimated that a severe reduction in hay quality and yield would have occurred if mowing had been delayed 10 days. Ten sweeps in each plot with a 15-inch net were made to determine larval populations. Hay samples from five yard-square areas were cut in each plot. We weighed the samples during cutting and again when they were air-dried. Field hay yields were determined from these samples.

In Lawrence County, 21 acres of an alfalfa field which had been treated with one-fourth pound of dieldrin per acre in 1955 were used. This field was located on the John Ward farm.

Granulated forms were applied April 13 when the temperature was 47° F. and sprays were applied the following day in 10 gallons of water per acre. Plant growth averaged 1 inch.

Hay and larval samples were taken on the same days and in the same way as those in Butte County. Field conditions were also similar as far as larval damage and stage of growth were concerned.

Effect of Granulated Insecticides Compared with Emulsions Applied for the Control of the Alfalfa Weevil in Two Counties in South Dakota, 1956

Insecticide	Pounds of Active Ingredient per Acre	Formulation	Butte County* Larvae per Sweep at First Cutting	Butte County* % Control	Lawrence County° Larvae per Sweep at First Cutting	Lawrence County° % Control
Heptachlor	.25	(2E) emulsion	1.8	95.2	0.3	96.1
	.25	(2.5%) granulated‡	8.4	78.1	0.1	98.5
	.50	(2.5%) granulated‡	0.6	98.4	0.3	96.1
Dieldrin	.25	(1.5E) emulsion	3.5	90.8	0.1	98.8
	.25	(5%) granulated†	5.0	87.0	2.2	73.8
	.50	(5%) granulated†	5.8	84.8	0.3	96.8
Check	—		38.4	—	8.4	—

*Emulsions applied April 17; granules applied March 16.
°Emulsions applied April 14; granules applied April 13.
‡Particle size 30-60 mesh.
†Particle size 30-40 mesh.

Granular Application Effective

Results of the trial, shown in the table, indicate that the granular application is as effective as the spray application in controlling the alfalfa weevil. Dieldrin and heptachlor are equal in effectiveness and the application of granular forms on snow in mid-March does as good a job as sprays applied at early growth stages of the alfalfa in mid-April. One-fourth pound and one-half pound applications of the insecticides are also about equal in effectiveness.

The measure of effectiveness of the treatments in the experiments was considered to be the population level of the alfalfa weevil, as measured by the net sweep samples taken in the individual plots.

New Trials Confirm Results

Further applications of granular insecticides were made in Butte County and Lawrence County in December 1956 and in Lawrence County in March 1957. Before mowing the following June, we checked weevil larvae populations. Granulated forms of the insecticides proved as effective in controlling the weevil whether they were applied during the winter or early spring.

Because granulated insecticides tested are practical at temperatures too low for using field-type sprayers, you can control the weevil by applying insecticides before the rush of spring work arrives.

DEFENSIVE DRIVING —

Winter weather means bad driving conditions. Do you know how to make yourself a safer driver in winter?

A safe driver drives defensively, says O. L. Hogsett, Illinois extension safety specialist. You may never have heard of defensive driving, but it's a well-known term to professional drivers who rack up thousands of miles of accident-free driving each year.

A defensive driver acts as though he is always under attack. His enemies are careless motorists, careless pedestrians and unsafe traffic conditions. The defensive driver makes allowance for these highway culprits. He avoids accidents by anticipating and allowing for the hazards created by the unsafe acts of others and by adverse traffic and weather conditions.

In short, you are a defensive driver when you drive for the other fellow as well as you drive for yourself.

—*University of Illinois*

Revolution in Greenup County

A famous novelist, poet and short story author writes about the coming of the tractor to his native Greenup County.

Condensed from
American Petroleum Institute Quarterly

Jesse Stuart

IN 1955, when members of the Greenup County, Kentucky, Fairboard were looking for horse-drawn farming tools to demonstrate to the people how agriculture had advanced, they failed to find many of the tools used only a short time ago.

They tried to find a cutter plow, once pulled by mules, horses, or cattle to break the roots in new land. They tried to find the once-familiar bull-tongue plow. They found one that had belonged to my father. It was in a state of decay and needed repairs badly. They found the single-shovel and double-shovel plows used for plowing corn. Even the one-horse hillside turning plow, with a swinging-mouldboard that could be shifted to either side, and the two-horse hillside plow of this same make, had become antiques. The one-horse corn drill was difficult to find. Less than a half-dozen were found in Greenup County. Horse-drawn hayrakes, mowing machines, disks, and harrows were not plentiful. What had happened?

"It's time we erected a new building on the Fairground just to house our farming antiques," said a member of the Fairboard, who was a modern prosperous farmer in Greenup County. "I knew this county was changing, but I didn't know it was changing this fast. It won't be long until our Future Farmers of America youth won't know what we're talking about when we mention the bull-tongue, single-shovel, double-shovel, one- and two-horse hillside turning plows, and corn drills. I grew up using these until after I was a married man. That was back in the early 1930's. I didn't believe that our horsepower would ever be put under hoods in these hills. But today, more than 85 per cent of

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the work here is done by machinery. And 90 per cent of Greenup County is uplands."

This didn't seem possible to anyone born before 1920. Well, it has happened. Long before it happened here, we read how the level wheatlands of Kansas were no longer farmed by horses, and how the cornlands of Iowa, Illinois, Indiana, and Ohio were now plowed and cultivated by machinery. Horsepower had gone into the machine, and the ingredient to produce that power is oil, something that comes from the good earth.

One large pine tree in Texas recently produced 3,404 board feet of lumber—at $35.00 per 1,000. It stood 131 feet tall.

When members of the Fairboard started searching for the old hug-me-tight they couldn't find one. I had seen one so often when I was a child, with a young man and a young woman sitting very close to each other on the small seat, pulled by a frisky horse over a dirt road! Now these were gone forever. In their searching they found less than a half-dozen ordinary buggies, and not one was in use. The express wagons were things of the past, but they managed to locate one, and while jolt wagons only a few years ago were plentiful, they were scarce items now and difficult to find. Jolt-wagon wheels are now used to decorate yards. They are often painted and leaned against a shade tree. Flowers, such as morning glories, are planted around them.

On this farm where we live today, and where I grew up, we have most of our horse-drawn tools, and a span of horses we keep for sentimental reasons. These horses do not work any longer. They belonged to my father, who passed away in 1954, and it was his request that we keep them, although long before his death he was having his land plowed and cultivated by tractor. In fact, we were the first to use a tractor in this valley. When the tractors and trucks started to replace horses and wagons, we didn't think we would ever be able to use tractors on our hillsides. But thanks to American ingenuity, this problem was soon solved by spreading the wheels out to a wider distance.

First we used the tractor only in the valley bottoms on this farm. The very first time we used a tractor here, people stood beside the field and watched it pull two plows turning the sod over. Then the surprise came when they watched it pulling a disk four times the size of one we had used three mules to pull. The tractor

not only pulled this disk but a cultipacker fastened behind. When the tractor pulled these two attachments down the creek bottom, it left the land behind as fine as silt. Our mule-and-horse-drawn equipment could not put land in as fine a shape as this. We had kept three teams—a span of large draft horses with big feet for the bottoms, and two mule teams, one a large team and the other small. We used these teams for our hillsides where we farmed corn and tobacco, grew hay and strawberries. Mules could stand up and pull on land so steep a man could hardly stand. We used the small mules on the steeps when we plowed corn, tobacco, and strawberries. And when we pulled the mowing machine over the pastures to cut the brush, or over the hillside meadows, we used the large mules.

Had anybody told me in the decade 1930-1940 that we would be cutting this pasture land with a bush-blade attached to a tractor, I would have laughed. Had anybody told me we would be digging postholes with a tractor, I would have asked him when his head had been examined. Had anybody told me a clumsy machine looking like a prehistoric animal would be developed to change the face of the earth, I wouldn't have believed that either. Yet today, due to the arrival of the bulldozer, airports are being built on mountain tops, and highways are cut through mountains that used to be steep climbs.

The effect of the soil bank in decreasing farm output has been "spotty." Crop production as of October 1 was 6% above the average of the three "good" years (1947-49) on which the crop production index is based.

On this farm we once employed a large and small dozer and a carryall for one day, and we made a two-acre bottom. We changed a creek from flowing down the middle of the valley. We moved it over against the hill. This gave us a small, undivided bottom. When the first dozer came here, crowds gathered to watch it work. I followed it, hour after hour, admiring its great power created by a very little amount of oil. This powerful dozer didn't require the more refined gasoline except to start its engine. Later we built hill roads over this farm that we had once tried to pull with plows, scrapers, and mule and horse teams. The dozer pushed giant rocks away we had planned to break into smaller ones with blasting powder. It cut a road around the side of a mountain

with ease. It never grew tired. In two weeks we had two miles of road connecting our lowlands with our highlands on this farm.

Although we had plowed our valley bottoms with a tractor, had made a bottom with a dozer and carryall, and had built a road to connect valley and ridgeland, we still had considerable use for our teams. We used them to pull the mowing machine to cut our hay and to mow our steep pastures. We used them to haul logs from the woods. We used them to plow new ground. We used our teams to rake hay and to haul it on our jolt wagon to the barn. Here we pitched the hay up from the wagon into the barnloft.

After World War II, more progress came to our farm. I had seen side-rakes pulled by tractors, in parts of the United States where the land was level. I had watched the hay baler follow the side rake and drop bale after bale onto the field. A tractor followed where men picked up these bales and hauled them to the barn. A few times I'd seen the baler, following the rake and baling hay, while a man stood on a wagon attached to the baler and loaded the bales, which then were hauled to the barn, making one operation do the whole job. This was a marvelous bit of progress that condensed loose hay and thus gave more space in the barns. But it was something I never thought would take the place of the way we had always handled our hay. Well, it did. And when the first baler came to this valley, our hay was cut, raked, baled, and trucked to the barn from the valley bottoms and the slopes as well.

This mountain of progress came to our farm in the early 1950's; it would have come sooner had it not been for World War II. Now our work—plowing gardens, hauling supplies, baling hay, cultivating corn, everything—was done, 95 per cent or more, by machinery. Gasoline, oil, and engines had replaced horses, mules. and the corn and hay to feed them. Our horse-drawn farm implements had become antiques.

Although oil-powered farm machinery had replaced horse-drawn equipment in our great farming areas ten to fifteen years before, it had now changed our way of farming and our way of life. Living was different and it was easier. We could do twenty times as much work and expend less energy than when we did everything by horse and mule teams and manual labor. Our getting machinery we could use on the slopes as well as in the valleys kept us on our farms. What we had done on our farm in our snug little valley others in

hilly Greenup County were doing too. They, too, were making progress. They, too, were plowing, preparing, planting, cultivating, picking, and hauling their corn and combining their wheat, oats, grass, and soybeans by machinery.

Average gestation period for dairy cattle is approximately 283 days, although there is some difference among breeds. Average gestation time for Ayrshires, Holsteins and Jerseys is 279 days, Guernseys 283 days and Brown Swiss 290 days.

Meanwhile, farms over the entire area were making the same progress we had made. Teaching agriculture in our high schools and our having an agricultural agent in each county had helped to bring in machinery to revolutionize our way of life. Many of the high schools, such as McKell High School, where I served as principal, now have land for our farm students to plow and plant and to learn how to farm with modern equipment.

The automobile, truck, bulldozer, lime and manure spreaders, haybaler, cornplanter, cultivator, cornpicker, tractor and all of the equipment that goes with a tractor, have sent our horse-drawn equipment into antiquity. They have sent our horses to a pasture field to spend their old age eating and kicking up their heels. The way of life in our valley, county, and tight farm belt has been changed by the power of oil and the machine.

I got sentimental about the passing of the horse and mule teams when an old mule driver here spent all the money he had inherited from his mother trying to save the mules. One winter he kept 35 mules in a big barn, feeding them corn and hay while he went hungry himself. I did a junior book called *Red Mule* about this character and the passing of the mules. While writing this book, I wrote to the State Department to find out what the mule could do that a machine couldn't. I tried to find a place where the mule and the horse could replace the machine. I learned we shipped mules and horses to our less progressive neighbors where the power of oil and the machine hadn't come into its own. And then I thought that, perhaps, hauling logs from the timber woods, once done by cattle and mules here, would still be done by mules.

While I was having these thoughts, my cousin, who was operating two sawmills, got himself a caterpillar tractor that he could take anywhere in the logging woods and haul enormous

logs to the mill. This logging tractor, that could go places a team couldn't go, replaced his horses and mules. I had great difficulty in defending my mules against the machine in *Red Mule.*

Now, the idea of defending them is as obsolete as the cutter and bull-tongue plows with which I used to break the roots in the new ground in plowing on this farm. Today, the dozer not only clears the land by rooting up the big trees, but it can pull a bog-harrow at the same time, and each of its ten giant disks is equivalent to a turning plow. The expense of the oil this giant dozer consumes would not be more than the cost of feed for a couple of teams. The giant dozer and bogharrow, clearing and plowing land, will do as much as twenty teams and one hundred men. Last spring I cleared 38 acres with a dozer and bogharrow in one week.

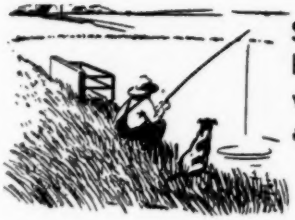
Oil and machines have changed our world almost beyond recognition. We have not been left out of the sweep of progress and compelled to leave our farms since machinery has been developed to work over our rugged terrains. Our animal-drawn equipment couldn't have kept us in competition much longer with other more productive, fertile, and level farming areas of America. But now we can compete with them for we have every machine they have. We can save time and labor, and when we don't work our machines they don't eat. Our way of life has been revolutionized and our farms now have a new look.

Once, a dinner bell in our kitchen yard called my mule and me to lunch. When he heard this bell, he froze in his tracks and wouldn't move another inch until I unhitched him from the plow. Later, we didn't have any use for this bell. A passenger plane flew over at 11:00 a.m., never missing a day and always on schedule. Even an oil-powered machine had taken the place of our dinner bell. And this was indeed a memorable change.

Need Lights for Cows?

Colorado State University researchers are looking into the possibilities of using electric lights to influence production and growth of dairy cows. They figure that if more hours of daylight in poultry houses increases egg production, it might have a similar effect on dairy cows. In their experiments, one group of cows will be exposed to several hours of artificial light while the control group gets only light from the sun. —*Better Farming Methods*

Good Fishing in Farm Ponds



Soil Conservation cooperators in Tennessee have dug 40,000 ponds. They stock them with fish, fertilize and collect up to $1000 a year from fishermen . . .

Condensed from Soil Conservation

L. Roark, State Soil Conservationist

THERE are about 40,000 farm ponds on District Soil Conservation cooperators' farms in Tennessee, and nearly all of them are stocked with bluegill and largemouth bass.

These ponds provide a lot of good fishing for the farmers who built them; many furnish sport and fish for town and city dwellers and extra income for the farmers. It is a common custom, in some localities, for city anglers to pay a small fee for fishing privileges in farm ponds.

G. E. Horn, chairman of the board of supervisors of the Davidson County Soil Conservation District in Tennessee, has four ponds on his place. All of them are stocked with fish and are fertilized regularly. Horn has made many friends and has taken in quite a bit of cash by allowing people from nearby Nashville and other communities to fish in his ponds. Here is his story, in his own words, about the first and most popular of his fish ponds:

Australia has earthworms 4 to 5 feet long, an inch thick, and often weighing a pound or more.

"This pond was completed in 1951. It was stocked with bluegill that fall and with bass in June 1952. The pond was opened for public fishing in May 1955. There was a lot of private fishing for 2 previous years, but people bothered me so much, calling and getting permission to fish, that I put up a box and allowed the public to fish. The take from the box is from $500 to $1,000 per year.

Reprinted from Soil Conservation, Government Printing Office, Washington 25, D. C.

"Some may not pay, but the honest ones do and my loss is not great. I would rather trust the people and have faith in my fellowman than gather that fraction of a per cent that I may lose.

Why is it that the prettiest sweaters always have gals in 'em?

"The lake was largely excavated, as there were no hills to work between, making it cost $4,000. It covers 3½ acres. It has a 3½-inch drainpipe with a trickle tube. The water is piped out for stock water.

"The multiflora rose fence around the lake is 4 years old and is good. The banks are in fescue sod, and areas between the bank and the rose fence are filled with shrub lespedeza and sericea lespedeza.

"I fertilize this pond, as well as my others. regularly to help make better fishing. The fertilizing is done simply by having someone row me about over the pond in a boat while I pour fertilizer from a bag into the water."

Disc Plows Renovate Pastures

Disc-plows are good tools for renovating pastures on hillsides or rough land.

For several years, University of Wisconsin agricultural engineers have been testing various implements for fall pasture renovation. What they want is a tool that will completely kill existing plants, leave the soil in a condition that will reduce erosion, and provide a good seed bed for a new seeding of grass and legumes.

Last year's tests by F. W. Duffee and M. F. Finner included a heavy duty field cultivator, 18-inch sweeps, a disc-plow, and a disc tiller. These machines were tested in combination with dalapon weed killer. The fields were old alfalfa-brome sod with a good growth of quackgrass and other weeds.

The disc-plow was the best implement from the standpoint of performance. It produced a very rough-looking field with many clumps which dried easily. The drying helps to kill the sod and the rough surface reduces erosion.

The field cultivator and disc tiller didn't completely sever all the roots of the sod. Where dalapon was used, the 18-inch sweeps did a very good job, but the disc-plow did the best job in unsprayed parts of the field. —*University of Wisconsin*

What's New in Livestock Feeding?

A review of new techniques in feeding developed during 1957 . . .

Condensed from

Western Livestock Journal

M. E. Ensminger, Chairman of Department of Animal Science, State College of Washington

AS 1958 begins, let us see what's new in livestock feeding—what new research achievements in nutrition have come out of state agricultural experiment stations, the USDA and private laboratories.

Urinary Calculi (gravel, kidney stones or water belly)

This world-wide, age-old malady is now being lessened simply by adding 1-5% salt to the concentrate ration of fattening steers and lambs, using the higher levels in winter when water consumption is normally lower. This remedy evolved out of research conducted by C. J. Flam as part of his graduate program under supervision of Dr. W. E. Ham, Department of Animal Science, State College of Washington. Dr. Ham and his associates found that, under conditions of their experiments, salt added at the rate of 10% of total ration entirely prevented calculi in sheep even when known calculi-producing rations were fed. They expressed the opinion, however, that lower levels of salt might be adequate and more practical.

As so often happens, those in distress start applying results of research leads before investigators have gone as far as desired. Based on the Washington studies, many cattle feeders now regularly add 1-3% salt to the grain ration (usually 1% in the summer and up to 3% in the winter); and one Kansas lamb feeder reports that he is adding 5% salt with good success.

Two points of caution should be observed. When high levels of salt are added to the concentrate ration (1) free-choice feeding of salt is not necessary and (2) other minerals, such as bone meal, should be incorporated in the ration.

This Washington station finding is of great practical importance, for urinary calculi affects

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males of all species, including man. In a survey I conducted and which embraced over a half million cattle, it was found that urinary calculi ranked third among nutritional diseases and ailments as a killer of cattle, being exceeded only by bloat and poisonous plants.

A man with a chip on his shoulder is usually standing still.

Parakeratosis (Greasy Skin Disease of Pigs)

Until recently, no one knew the cause of or cure for parakeratosis, commonly called greasy skin disease of pigs. It was simply known to affect pigs from 1-5 months of age and to produce economic losses chiefly through reduced gains and lowered feed efficiency. Now scientists know that this disease is caused by a calcium-zinc imbalance in the ration — where calcium is high (more than 1%) and the zinc is low. It can be prevented or treated by adding supplementary zinc when rations high in calcium are fed. Under such circumstances, it is recommended that there be added to the ration .4 lb. of zinc carbonate or .9 lb. of zinc sulfate per ton of feed. Although zinc is effective in treating the disease, it has not been shown that zinc deficiency causes it.

Pelleting Rations for Lambs

Experiments conducted at several experiment stations have shown that lamb fattening rations in which both concentrates and roughages are combined in pelleted form generally produce larger gains with slightly less feed. Also, the poorer the quality of roughage, the greater the advantage from pelleting — because such preparation assures complete consumption of roughage. In most experiments, however, the cost of pelleting more than offsets these advantages; and in no case was consideration given to the lessened labor and storage costs as a result of feeding pellets.

Bloat

Bloat has been reported since Biblical times, but even now—2,000 years later—little is known about its causes, prevention and precise methods of treatment despite the fact that it costs U. S. beef dairy and sheep producers more than $40 million annually. But new light on this age-old problem is slowly emerging.

Based primarily on duration, degree, type and location of the condition, bloat is now classified as acute (of short duration) or chronic (of long duration); mild, moderate or severe; frothy or foamy and nonfrothy; and pasture bloat and feedlot bloat.

Barrantine and co-workers of the Mississippi station list the following five sources or types of bloat: Legume bloat, feedlot bloat, toxic bloat (caused by such toxic substances as hydrogen cyanide, ammonia, etc.), pathological bloat (caused by abscesses, adhesion, etc.) and obstructions of the esophagus. The Mississippi workers also ranked several legumes as follows from the standpoint of relative tendency to cause bloat, with Ladino clover given a base value of 100:

Legume	Bloat Index
Persian clover	111
Alfalfa	108
Ladino clover	100
Red clover	83
White Dutch clover	64
Crimson clover	7

The lower the bloat index in the above table, the less the incidence of bloat.

In recent years, intensive studies designed to ferret out various aspects of pasture and feedlot bloat have progressed at several experiment stations, in the USDA and in private laboratories. Among them are the following:

1. Researchers at the Michigan and Minnesota stations are attempting to evaluate the role played by certain "reflex" mechanisms in controlling rate of belching and secretion of saliva.

2. Wisconsin and Iowa scientists are studying surface active agents (detergents, oils, etc.), antibiotics and other additives.

3. At the South Dakota station, work is in progress on alfalfa varieties and types from the standpoint of effects on bloat production.

Mt. Zircon, Maine, has one of the world's two known moontide springs — it flows 60 gallons per minute during the full moon, and 40 gallons per minute during ebb moon.

4. The Washington station is studying bloat-producing properties of certain legume juices and effectiveness of certain antibiotics in alleviating bloat.

5. The Mississippi station pioneered in the use of certain antibiotics and other additives as bloat preventives. They found that a dosage of 75 mg. of procaine penicillin would prevent bloat in cattle grazing Ladino clover. However, in realization that giving capsules to prevent bloat is impractical, they have wisely directed their efforts toward finding a sound and reasonable method of getting the desired amount of penicillin into cattle, such as through penicillin-salt mixtures.

Although there is no complete answer yet, the Food and Drug Administration has accepted the

use of specified amounts of two antibiotics—penicillin and terramycin—in mixed feeds and in salt as an aid in preventing and controlling bloat. But because of variable results secured in the use of these products, much more experimental work is needed. Where trouble from bloat is encountered, therefore, it is recommended that stockmen confer with a competent animal scientist or veterinarian relative to the use of these or other products.

Silicone, detergent and oil preparations are also being advocated by some, and marketed, as aids in prevention and treatment of bloat. However, their degree of effectiveness seems variable; dependent, in all probability, on the type of bloat.

No sure way of preventing bloat is known. However, the incidence may be lessened by (1) avoiding straight legume pasture, (2) feeding dry forage along with pasture, (3) avoiding rapid fill from an empty start, (4) keeping animals continuously on pasture after they are once turned out, (5) keeping salt and water conveniently accessible at all times and (6) avoiding frosted pastures.

Time permitting, severe cases of bloat should be treated by the veterinarian. Puncturing of the paunch should be a last resort. Bloat can be relieved by use of a large-size stomach tube. Mild cases may be home-treated by (1) keeping the animal on its feet and moving and (2) drenching with a surface-active agent such as (a) ½-1 pint mineral oil or (b) a mixture of 1 tablespoon turpentine, 1 tablespoon aromatic spirits of ammonia and 1 quart water (a mature cow may be given the full dosage of either, whereas a mature sheep should be limited to about 1/5 of either amount.)

Enzyme-Treated Grains

In 1957, Drs. McGinnis and Jensen of the State College of Washington achieved a notable "first" when they found that by either (1) water treating or (2) adding dry enzymes, barley and oats could be made equal in feeding value to corn for poultry. Barley is normally rated 70% feeding value of corn for chicks and about 80% for laying hens; but enzyme treatments make it equal to corn. The Washington scientists postulate that the treatments make more energy available, that chicks lack the right enzymes to digest barley and oats efficiently. To date, wheat and corn have not shown similar response to the enzyme treatment; and it is not known whether the "souped-up" grains will be more effective than untreated grains for swine.

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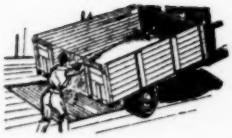
Power Feeding



The feedlot is catching up with field crop mechanization . . .

Condensed from Missouri Ruralist

LONG-awaited turn to mechanization in the feed lot now is coming rapidly. Work in the field long has been done by power equipment, but time-consuming hand labor has persisted around the farmstead in many livestock feeding operations.

Power for mechanizing the feed lot is coming from electric motors operating feed augers. Power also is supplied by mechanical feed wagons and loading and unloading devices.

Emil Wallach, Eureka, Missouri, has planned his "retirement" on the farm with a new approach. He is developing a "push-button" steer-feeding system aimed at taking much of the labor out of livestock feeding.

Mr. Wallach and his sons have a large-scale operation in St. Louis County. They have worked long and hard. Plans call for a division of the farm operations, soon.

Also in the plans are a comfortable new home, near the new feeding system. The automatic feeding system already has been installed It consists of a metal glass-lined silo with a built-in, automatic unloading device at the bottom of the silo. This unloader is powered by a 5-horsepower electric motor.

Also in the system is a 100-foot automatic feed bunk, with an auger installed to move feed the length of the bunk. This, too, is powered by a 5-horsepower motor.

The feed bunk runs the length of a shed. It is located at the edge of the shed, and there's concrete paving in the lot. Steers can eat from both sides of the bunk; at least 100 animals can be fed at once!

Obviously, this system represents a considerable investment. Why should a man who is looking to a time of less work make

Reprinted by permission from Missouri Ruralist, Fayette, Missouri

such an investment? Mr. Wallach thinks with this system he can continue a farming operation. He is selling his purebred Polled Herefords and turning to steer feeding. He thinks he can eliminate so much of the labor he alone will be able to handle most of the steer-feeding operation.

Some insurance companies refuse to insure a driver that decorates his car with squirrel tails, baby shoes, dice and other paraphernalia. We suppose on the theory that if he acts like a clown he will drive like one. —Winterset (Iowa) Madisonian.

To get better feed for steers, Mr. Wallach is planning to use "double-strength" silage. That is, use twice as many ears of corn as normal in silage. He can snap ear corn and add this to regular silage. He might turn to ear-corn silage, putting this in to obtain the richest feed at the end of the feeding period.

Can Use Variety of Crops

With his sealed silo he can use a variety of crops for silage, harvest anything that is available at any time of year.

The turn to mechanical feeding of livestock is coming quite rapidly in Missouri. Livestock feeders, like other farm operators, have about decided that hiring farm labor is a thing of the past. They are spending considerable sums to eliminate hand labor.

Excessive speed is responsible for only 3 out of each 10 highway fatalities.

Robert Davis, and his son, J. W., of Howard county, have a large-scale operation with emphasis on steer feeding. They have 3 upright silos at one spot, each holding 310 tons. They also have other silos, including some trenches.

To speed feeding operations they have built a king-size feed bunk, 2 long concrete bunks, each to be about 540 feet long, with a graveled lane between. The big upright silos are equipped with a mechanical unloader. A shed has been built alongside the silos and protects the loading operation from wind and weather in winter. A power feed wagon is used.

Concrete slab has been poured along the front of bunks on each side, and may be extended as needed.

Morrison Hughes, Fayette, is constructing a 400-foot concrete bunk at his farm this fall.

Power feeding is not limited to such large operations. Smaller

enterprises can make use of the same type equipment.

G. W. Davis, Saline county, has a simple feed auger installed in his feed bunks outdoors for a dairy-feeding operation. The bunks extend from an upright silo, and cows can eat from both sides. An electric motor powers the auger.

Donald E. Ridings, Painton, built his automatic feeding system for steers. He has a feed house that is a self-feeder with sloping floor. An auger installed in the bottom of this house moves the feed from the storage unit to the feed bunk.

There, another electric motor powers a feed auger that moves feed the length of the bunk. The auger is in a smaller trough with wooden sides and metal bottom with holes at intervals. This feeding system does a good job of moving grain, and is strictly a push-button operation.

High Farm Output Limits Farm Prices

Farm prices are not likely to increase substantially in relation to industrial prices, barring war or other large-scale catastrophe, according to Harold G. Halcrow, Agricultural Economist at the University of Illinois.

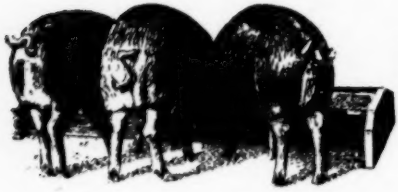
Halcrow bases his statement on the expansion of farm production due to continued introduction of improved methods. In recent years, farm output has gone up three to four percent a year in spite of serious drouth in various parts of the country.

While farm price supports and storage programs can prevent sharp declines in farm prices, Halcrow emphasizes that they cannot substantially improve the farm price level over a period of years. He suggests that farmers who expect to have a good income will be required to increase the size of their operations and take advantage of modern farming methods in their production.

Management of capital, which on an average corn belt farm may be $100,000 or more, and farm management decisions must be carried out skillfully if a farm family is to have a good income. Adjusting the farm unit to these changing farm conditions is most important for the welfare of farm people, Halcrow believes.

—*Farm News*

From Inside the Hog House



A practical young hogman explains his methods . . .

Condensed from
Breeder's Gazette

Tom Carlin, Lancaster County, Pennsylvania

YOUR farm and what you have on it took a lot of hard work by somebody. Those of you who have been on the land many years know this, and you youngsters will soon learn. It takes brains to be a good farmer.

Let's talk a little about your Swine Enterprise. Right now there isn't much we can do but take the right kind of care of those 90- to 125-lb. shoats we have, the sow herd and the boar. If we do the right kind of a job, you must be sure your boar is a Meat-hog. One that weighed about 225 lbs. at 6 months, would cut a 30-in. side, probe 1.3 backfat and have at least a 4-sq. in. loineye area. If you don't have this kind of boar, you don't have a boar. Don't forget to count the teats on that boar either. Just use a couple 10-teated boars and see how many 14-teated gilts you can find around in a couple of years. None.

Upgrade the Sow Herd

If your sow herd is old fashioned, now is the time to start thinking about getting some trim young ladies working for you. With the hog grading program and as much as $1.25 per cwt. premium being paid — that's $2.50 or more per 6-months-old hog.

With the snow perhaps knee deep, now is the time to check on that feed formula. If you have hand-bred your sows and know the date they are due—that does make it nice. If you are a guesser, let's hope you guess right because those 3-lb. little bundles get cold and stiff real quick when it's down to zero. Let's bring those sows into the farrowing house at least 4 days ahead of time. A nice warm bath with soap won't hurt a thing. Goes well with that hot water!

Lye-scrubbed 7 x 8 ft. pens I like real well. You may like far-

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

rowing stalls. I noticed where some of Iowa's Master Swine Producers have their farrowing stalls piled up out behind the hog house. That doesn't mean farrowing stalls aren't good insurance, because they are. It just means to me those Iowa boys know their sow herds like we all should.

A University of Illinois livestock specialist says that 40 per cent of ground corn added to legume or oat silage at ensiling will provide all the corn needed in a fattening ration.

It depends on the weather whether you need an ordinary 100-watt light bulb or a 250-watt heat lamp. As for the bedding I still like a little good bright dry straw. You may like to use ground corn cobs or wood shavings. The m a i n thing — keep it dry.

Those sharp needle teeth will cause a lot of trouble if not cut out. Ear-notching each pig in the litter is well worth the time, but notch those gilts for sure. A lot of hogmen like to cut and dip that naval cord also.

Get Pigs Off to a Good Start

After a few days put some pig-starter in a pan by the light. These little fellows will nose around in it, but keep it there and see that it is fresh. When they are born their stomach is about as large as an ordinary hen's egg. That takes a high-powered feed. A shovel full of fresh sod helps a lot too.

Castrate those boar pigs you don't wish to keep when you move them out at about two weeks of age. They are so much easier to hold at that age too. You can vaccinate at 6 to 8 weeks. By vaccinating and weighing a few days before weaning at 8 weeks, you save one handling. Even if you don't see any worms, it will be well worth your time to treat your pigs. Don't mark it down as expense: just one worm per pig will pay the bill. If you used a good worm e x p e l l e r and didn't see any worms, it was cheap insurance. Doing this at 10 weeks breaks the worm cycle.

For growing shoats, I like corn cobs for bedding, just like they come from the sheller. The main thing to go along with your worming program is to have c l e a n fields and clean, well-sprayed houses.

As for the feed, it should be made up largely of ground yellow corn and protein with some extra salt and minerals added. By grinding the feed and mixing it, I feel that each pig is getting a ration balanced about as good as he can do it and perhaps a

little better. This would be my market hog ration along with plenty of clean, fresh water. Thirty or 40 head to the lot make a nice size group.

For my growing gilts and boars, I take out part of the corn and use some oats or wheat midds. For the sows and boars plenty of good quality oats and alfalfa can't be beat. Keep them in good condition, not too thin —not too fat. I don't feel a self-feeder is in order here.

After about 180 days of trying to raise the right type of hog in the right way comes the part we don't have too much control over —pay day. Of course if there aren't too many in-and-outers, if we have a large percentage of U.S. No. 1's, and if we can walk at least 8 pigs per litter across the scales, we have a chance for more profit.

Figuring Your Profit

We are well aware that when corn is $1.50 per bushel and protein $5.00 or $6.00 per hundred, we are going to have $20.00 to $24.00 in each 200-lb. hog. If hogs sell for $15.00 or $17.50 per hundred, that gives us $30.00 to $35.00 per hog, or a margin of $10.00 to $15.00 per hog. Now before you hurrah, mamma sow had to eat 6 months. And it depends on how many pigs your boar sired as to what per cent to charge against each pig, as well as the cost of the boar's feed. Your equipment, houses and machinery are wearing out, plus the cost of your bedding, electricity, vet, trucking and pencils we use to figure with. And don't forget your labor.

Yep, it takes hard work and a sharp pencil. But most of all a Love for Hogs.

Lamb Records Vital for Wool-Incentive Pay

Growers marketing lambs will need good sales records to apply for payment under the wool-incentive program, says A. W. Willis, Wyoming University extension economist. They will also need records of all purchases.

Mark records of fall-marketed lambs "unshorn," since payments are made only for unshorn lambs, Willis says. Records must include the buyer's name, his signature, date of sale, and the number and live weight of the lamb.

To qualify for payment, a grower or feeder must have owned the lamb for at least 30 days before sale. Willis cautions lamb feeders to keep accurate records proving length of ownership. Final date for filing for payment is April 30, 1958.

—University of Wyoming

Electric Motor Preventative Maintenance

Give your farm motors proper care and protection — it pays . . .

Condensed from Electricity On The Farm

O. E. Benanchietti

SINGLE PHASE electric motors are exceptionally well designed, sturdily constructed, amply insulated and completely protected to withstand atmospheric and other conditions to which the majority of motors are subjected. However, a small periodic service (preventative maintenance) to the motor will contribute to added long, continuous trouble-free operation.

In this article we will discuss five of the most common detrimental conditions encountered on farms and the recommended action to be taken to protect the motor against each of them.

Improper Wiring

The first and most common problem is the improper wiring of electric motors. If the physical size of the cable or wire selected is too small for the length of run from the motor to the distribution pole, then the voltage available at the motor terminals is less than that for which the motor is designed. All motors are generally designed to operate successfully where the voltage variation does not exceed 10% above or below the rated voltage. If the voltage available at the motor terminal due to improper wire size is more than 10% below normal, the current for a given load will increase rapidly. This increase in current causes an increase in the motor heating which shortens insulation life and causes burnouts.

In addition to overheating of motors, low voltage reduces motor torque output. The torques of a motor will be reduced by approximately twice the voltage variation. For example, a 10% voltage drop will actually reduce the torques by about 20%. This reduction of torque could be sufficient to cause the motor to stall during starting or cycle during acceleration and cause the motor windings to overheat and burn out.

All of these situations can be avoided by providing wiring circuits capable of holding up the needed voltage for the motor needs.

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Overload Protection

Another serious problem encountered frequently on farms is the overloading of motors. Hand in hand with this is the lack of or improper use of overload protective devices.

Some people are like blotters — they soak up everything, but always get it backwards.

First, what is an overload? Well, a motor is said to be overloaded if excessive current is drawn by the motor. This excess current causes motor heating and thus windings get hot, their insulation burns and the motor "burns out." The overload conditions can be caused by many reasons. The most common are:

- Motor size (hp) is to small for connected load.
- Improper pulley alignment.
- Low voltage at motor terminals.
- Improper belt tension.
- Driven machine becomes locked, jammed or impeded by foreign material.
- Bearings become frozen because of faulty lubrication.

All of these conditions which cause motor overloading can be eliminated by proper installation. However, the only complete protection is to use an overload device such as:

1. *Manually operated* starters which are normally recommended and designed for starting and stopping of small motors. They consist of a switch manually operated by a button. Overcurrent protection is provided by a built-in thermal overcurrent device.

2. *Magnetic starters* which are recommended and designed for frequent starting of motors. They operate on across the line voltages and are suitable for remote control, push buttons, manual switch control or automatic control accessories. Thermal overload built-in devices provide complete overcurrent protection.

3. *Built-in thermal* overload devices in the motor. This device is properly designed and installed by the manufacturer to protect the particular motor during any starting or running condition. The device may be either a manual or automatic reset type. The manual reset type is preferred for farm applications. These devices are available on most single phase motors up to 5 hp and on practically all three phase motors.

4. *Time-delay fuses* used to protect the circuit serving the motor. This type fuse permits excess current passage for short durations of time such as starting. It breaks the circuit on direct shorts or when excessive current passes for an undue

length of time, usually ten or fifteen seconds.

Keep Motors Clean

Dust and dirt are very harmful to electric motors. On the motor windings dust acts as a layer of insulation which will confine heat until it may cause the motor to burn out. Once inside the bearings the dust will contaminate the lubricant plus acting as a very fine abrasive to the highly polished surfaces. Dust also clogs the motor openings and thereby impedes the ventilation of the motor which causes over-heating.

But more important dust and dirt in motors acts as a dry sponge and will absorb any moisture, excessive oil or lubricant and can cause a gummy mess. Dust on commutators, brushes or slip rings will act both as an abrasive and an insulator that multiplies wear and blocks the normal flow of current.

The best way to fight this problem is to store motors when not in use in a relatively clean area. When the motor is to be used it should be thoroughly wiped of excessive dust or dirt. A visual inspection of the windings, centrifugal mechanisms, brushes, commutator and slip rings should be given. If excessive dirt and moisture has caused a gummy layer, disassemble the motor and wipe thoroughly clean. If only dry dust is noticed, dry compressed air can be used to blow it out.

One of the best ways to insure a good patch of strawberries is to keep it free from weeds.

Lubricate Properly

Proper lubrication means the right lubricant, in the right amount, and at the right intervals. The life of the bearing is essentially the life of the grease. If too little grease is provided, it will run dry and cause wear and breakdown. Overlubrication can be just as serious. It will cause windings to become sticky and vulnerable to dust, dirt, pollen or any other foreign materials which might enter the motor. Overlubrication may also cause bearings to run hot. The resultant gummy paste adds an extra layer of insulation to the motor windings and can cause the motor to overheat and burn out. Excessive grease and oil on winding insulations can cause deterioration of the materials and short motor life.

The best procedure for proper lubrication is to follow the motor manufacturer's directions. Also, keep a dated record of lubrications.

Ball bearing type motors on severe type service such as a silo

unloader or barn cleaner should be relubricated about once a year. General service motors such as fans, pumps or conveyors need it about every three to five years. A sleeve bearing motor in general should be relubricated two to three times per year.

Damage by Birds or Animals

The last problem often encountered in farm application is the damage caused by birds, pets, and rodents. Many farmers have turned on their motor after a winter season of disuse to find either terrific noises in the motor or to have the motor burn out. Examination shows that mice have built nests in the motors, eaten the insulation and in general made a mess of the motor windings.

On occasion it is found that dogs and cats have buried bones or other foreign materials in the motor which has impeded the motor's current operation and thus caused the motor to burn out. In some cases it has even been noted that mice or kittens will enter between a morning and evening operation just to keep warm on cold days. Any opening large enough for birds or mice in a farm motor is a possible invitation for trouble.

The only possible method of eliminating this trouble is to screen over all motor openings. Most motor manufacturers provide screens as an integral part of the motor or as an accessory kit which can be mounted by the farmer when the motor is installed. The installation of screens will insure added long life with trouble-free operation.

"Crooked Snout" Disease

Crooked snout disease in swine can best be controlled by not raising pigs year after year in the same lot and by obtaining clean breeding stock. This is the advice of Dr. Don W. Thomas, Utah extension veterinarian.

He says the disease, properly known as atrophic rhinitis, is nonfatal but retards the growth of young pigs. Neither the cause nor cure is yet definitely known. Persistent sneezing is an early — often the only — symptom. It also may cause nose bleeding, nasal mucous discharge and coughing or irritation of the snout, which causes the pig to rub his nose against some solid object to seek relief, Dr. Thomas says.

Atrophic rhinitis first was reported in the U. S. in 1944. U. S. Department of Agriculture researchers have found that rats carry the disease. —*Utah Extension*

Bumper Crops Plus Temporary Storage Means RATS

Here's a rat control program that might save you a great deal of money . . .

Condensed from Nebraska Farmer

DID you extend a special invitation to rats this fall? That question—and your answer—have particular meaning this year.

The bumper crop of corn and grain sorghum on farms has meant a lot of temporary storage—in many cases corn has been piled in the open or in makeshift enclosures. And without adequate protection, that's just like sending rats a special invitation to come and help themselves.

Rat troubles are always worse in the fall and winter. Food and shelter in the fields grow scarce, so the rats move to the more inviting farm buildings.

How can you tell if your farm has rats? Here's one rule of thumb to go by:

If you sometimes see evidence of rats, but don't actually see rats themselves, there are anywhere from 2 to 100 rats on your farm. If you sometimes see rats at night, never in the daytime, 100 to 500 rats. If you see many rats by night, occasionally a few by day, 500 to 1,000 rats. And if you see large numbers of rats both day and night, up to 5,000 rats.

Poison Rats First

If you find you do not have rats on your farm, just how can you cancel that standing "dinner" invitation? The first step in a farm rat control program is poisoning to cut down the rat population. Here you can either use a combination of two poisons — red squill and Warfarin — or just Warfarin alone.

Robert Roselle, extension entomologist at the Nebraska College of Agriculture, recommends the double poisoning only when you have a very high rat infestation on your farm. With normal or low rat population, Warfarin alone will do the job, although it may take a little longer.

Red squill is a fast-acting poison that gives you quick command of the rat situation. It is fairly safe to use because it

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causes nausea and vomiting in man and domestic animals. Since rats cannot vomit, they are killed if they eat a fatal dose of red squill.

Did You Know That . . .

Every year rats cost farmers $2 billion?

There are 170 million rats in the United States — 100 million that live on farms?

Rats destroy food equal to the production of 200,000 average farms—enough to feed 10 million people? (There are only around 100,000 farms in Nebraska.)

Rats damage or contaminate enough wheat to make 6 million loaves of bread?

Each rat costs you $22 per year —$2 worth of feed eaten plus ten times that amount destroyed by contamination?

Rats breed 8 to 10 times a year — average 8 young per litter — can produce young when they are 3 to 4 months old?

If you delay your rat control program 1 month, each pair of rats can become 10 rats—1 year, up to 1162 rats?

But since red squill has an extremely strong taste — normally very objectionable to rats—those rats which get a sub-lethal dose of poison won't feed on red squill baits again. So this poison is pretty much of a one-shot affair, to be followed by a slow acting, tasteless poison bait.

Torpedo-type baits work best with red squill, says Roselle. To make these baits, use the following recipe:

2 oz. fortified red squill
½ lb. hamburger (or dog food)
8 oz. canned fish
2 cups oatmeal
1 cup corn oil

Hand mix the ingredients thoroughly. Then cut wax paper into a number of 4-inch squares. Put a teaspoonful of the bait mixture on one of the squares, pick up the four corners and twist the ends to form a small packet. Rats often prefer to carry their food to the nest to eat and these small packets or torpedos are just the right size.

Roselle recommends discontinuing red squill baits after one or two nights of use and following up with an anti-coagulant, Warfarin type poison.

Rat poisons containing Warfarin—or similar compounds such as pival and fumarin—work this way: The poison contains a chemical which promotes thinning of the blood; it prevents blood from clotting normally. After repeated feeding on the poison baits, rats die of internal bleeding.

Since Warfarin works over a period of time—usually 5 to 14 days are necessary for death—rats do not become "bait-shy" as they do with quick-acting poisons such as red squill. Roselle says if Warfarin bait is palatable and attractive, rats and mice will

continue to eat it right up to the time of their death. Thus Warfarin can be used for year-round control of rats and mice.

Rumen bacteria normally will produce all of the vitamins that mature dairy cows need except vitamins A, D and E.

Available Now

Warfarin-type rat poisons are readily available either premixed for immediate use or as a concentrate to be mixed at home with oatmeal or corn meal. Addition of 1 teaspoonful of corn oil or bacon grease to each pound of bait will make the taste more acceptable to rats and mice. However, the oil should be added just before using or the bait may become rancid.

Permanent bait stations should be set up at a number of places on your farm. You can make these bait stations from cardboard or wooden boxes with holes cut in each end, old tile or metal pipe, old orange crates or simply a board nailed against the wall of a building. Then place the bait inside the station in old coffee cans or similar containers. The main requirement is that bait stations make the poison readily available to rats while keeping it away from other animals and children.

Place the bait stations in runways in corn cribs, barns, hog and cattle sheds, machine sheds, seed bins and trash piles—anywhere rats are likely to be. Roselle says that rats like to run along the sides of buildings, so it's best to put your bait stations right up against the wall. The average barn, machine shed and corn crib each should have at least three stations.

Inspect Stations Daily

Inspect your bait stations daily when they are first set out. Make sure that each location has enough bait so that some will remain the next morning. Bait should be fresh and palatable—moldy, wet or old bait covered with dust is not attractive to rats. After your baiting program is well underway you won't have to check the stations as often.

Roselle offers this additional tip: Dust a layer of flour or white powder around the bait stations. Then you can see whether rats are visiting the stations.

Don't repair or disturb rat holes, runways or burrows until the poisoning program is well underway. But after control is fairly complete, then it's time to take steps to prevent future rat trouble.

The more you do to rat-proof stored grain, the more success you'll have in keeping rats off

your farm. Loose grain lying around is a picnic for rats. Old piles of machinery parts stacked against the side of a building are ideal shelters. Rats find excellent nesting places in old lumber piles, fence posts, railroad ties and piles of telephone poles.

Clean up and remove rubbish and trash which provide hiding places for rats. Raise all stored material such as lumber, firewood or sacked feed off the ground—18 inches is the recommended height. Repair previous rat damage.

Rat-proof existing buildings as well as you can—nail metal flashings on door edges and sills, cover holes with sheet metal, concrete or quarter-inch hardware cloth and use metal collars around all supports. When building new cribs, use either deep cement foundations or 2½-foot concrete piers.

Strong Demand for Farmland Will Continue

The present strong demand for farmland will continue, according to F. J. Reiss, Illinois extension specialist in land tenure. Land prices, though, will tend to level off, Reiss believes. Right now they're supported by demand for land to enlarge present farms.

Very few farms are now being sold. Reiss cautions buyers not to let a few sales set a price value for real estate that must pay off an indebtedness from its own earnings.

Interest rates on first mortgage loans are now higher than the rate earned on land figured at its current sale price. Such prices may be justified when an additional tract is needed to make better use of available labor and machinery. But they may be too high for buyers with small equities and no other source of income. High interest rates on high values quickly add to the credit costs of buying land.

Increasing non-farm uses of land taken for highways, industrial plants and other purposes decrease the land available for agricultural production. But increases in farm production per acre through use of more fertilizer, better soil management and insecticides have more than offset decreases in land areas, Reiss concludes.

—University of Illinois

Stop Those Thieving Cattle Lice

It's fairly easy to do and lice control pays good dividends . . .

Condensed from Wisconsin Agriculturist

THERE'S no excuse for cattle lice in your dairy herd. These little insects are one of the easiest pests to control. But if they're not looked after, they can make life miserable for cattle and take a bite out of the milk check too.

Now is the time to look over your cattle to see if lice are starting to build up. On some farms dusting for cattle lice is a routine winter job. On others the job is done as the need arises.

Dust Cattle for Lice

"We dust the cattle as soon as we see any lice," says Frank Case, farm manager in Waukesha county, Wisconsin. "And then we go through the whole barn and dust everything from milk cows to young stock and calves."

Case uses one of the common louse powders like rotenone or pyrethrum. He sprinkles the dust along the topline and rubs it through the hair. To get complete control he dusts again in 10 days to two weeks.

Other farmers, like Ben Hodgson, Dane county, count on clipping to do a lice control job.

"I clip my cows every winter as part of my quality milk program," says Hodgson. "While I'm clipping tails, udders and flanks, I clip along the backbone where lice usually congregate."

Lice concentrate where hair is the longest. Neck, shoulders and back are the most common locations. If this long hair is clipped off, lice don't multiply.

Hodgson clips a strip about 10 inches wide down the back from the neck to the tail. Clipping works so well for him that he doesn't need to dust for lice control.

Lice seem to assemble along the topline and use the backbone as a main avenue of travel to infest other parts of the body.

Four different species of sucking lice make up the group that commonly infests cattle. They live their entire life on the animal. Activity is slow during the warm months, but as soon as temperatures begin to drop, the louse population starts to build up.

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Lice lay their eggs near the base of the hair. In a week or 10 days, the eggs hatch. Two weeks later these young lice are mature and begin to have offspring.

It's easy to see the damage that lice could do if left to multiply uncontrolled. The possible population buildup from a single pair of lice during the winter is unbelievable.

A pair of lice in September would have 30 offspring in October. By November the population would number 450, and by December there could be over 6,000 lice.

If nothing checked their growth, by March the original pair would have increased in number to 20 million.

It doesn't take much imagination to figure the loss of blood from an animal infested with thousands of lice. Loss of blood means loss of flesh and milk. Cows drop in production and heifers gain slowly.

Treat Cattle Now

December is always a good month to clip or dust livestock to control lice. A treatment again in February should take care of the job for the winter season.

A number of insecticides are good for louse control. A common one that's effective and safe is 1½ per cent rotenone dust applied at the rate of 3 or 4 ounces per animal.

Remember that federal regulations don't allow the use of methoxychlor for any kind of insect control on dairy cattle.

Some manufacturers now have a vacuum-type cleaner on the market for use on livestock. You will find that these can be a big help in keeping cows clean and in getting rid of lice too.

Hog Losses

Swine enteritis ranks as one of the major causes of hog losses from the time when pigs are weaned until they are ready for market. This disease may easily occur after pigs are shifted to a heavy diet, particularly corn. Veterinary medical authorities say that in most outbreaks of enteritis there is an inflammation of the colon and cecum — the blind pouch at the head of the large intestine. The inflammation often is fatal. General symptoms for which farmers should be alert include bloody scours, a gaunt appearance, and loss of considerable weight. Call a veterinarian at first sign of symptoms.

Why Use Superphosphate with Manure?

Crop-producing value can be approximately doubled . . .

Condensed from Plant Food Review

MODERN agriculture requires large quantities of fertilizer to replace plant food removed from the soil by harvested crops and livestock products and to improve soil fertility for profitable crop and livestock production.

Only a small proportion of this total requirement can be furnished by animal manures—the balance must be made up by commercial fertilizer. Moreover, manure generally is an "expensive" source of plant food. A modern commercial farmer simply can't afford to buy his plant food requirements in the form of manure.

Nevertheless, animal manure *produced on the farm* is a valuable source of plant food when properly handled. One ton of fresh manure contains plant food with a value equivalent to about 100 pounds of commercial fertilizer of a common grade.

However, animal manures usually cannot supply the full plant food requirements of a crop in the proper balance. Manures are relatively low in phosphate. Much of the nitrogen often is lost in handling and storage or otherwise is not available to the growing plant.

Crop-producing Value Doubled

The crop-producing value of manure can be approximately doubled by reinforcing it with superphosphate. Adding superphosphate not only increases the phosphate content, thus improving the plant food balance, but tends to prevent the escape of ammonia gas during fermentation, thus reducing substantially the loss of nitrogen. Other good management practices also are necessary to insure maximum returns from manure utilization.

It simply is good business for a dairyman, poultryman or other livestock operator to make full use of the animal manure pro-

Reprinted from Plant Food Review, published by National Plant Food Institute, 1700 K. Street, N. W. Washington 6, D. C.

duced on his farm or ranch. It is seldom, if ever, however, that the manure produced on a farm will provide all the plant food needed for top yields and profits or even replace the plant food removed in crop and livestock products.

Give wool-blind sheep a chance. At least shear the wool away around their eyes so that they can see. A sheep is naturally timid. If they are wool-blind, they are helpless.

An average ton of fresh manure contains about 10 pounds of nitrogen (N), 5 pounds of available phosphate (P^2O^5), and 10 pounds of potash (K^2O). This is equivalent to about 100 pounds of a 10-5-10 fertilizer. However, when allowance is made for nitrogen losses and the fact that some of the nitrogen will not be available to growing plants, a ton of manure frequently will be more nearly equivalent to 100 pounds of a 3-5-10 or 4-5-10 fertilizer.

Vary Widely in Composition

Actually, fresh manures may vary widely in composition, depending upon the kind of animal. Different kinds of feed also will cause variations in content, as will the manner in which the manure is handled.

The amount of manure produced in a year varies widely by type of animal, but when the outputs of equal weights of each type of animal are adjusted to the same water content (65% water is the base usually applied), the differences disappear. Equal weights of livestock also will produce about the same quantities of organic matter in any given time.

As a general rule, one ton of livestock, regardless of kind, will void about one ton per month of excrement based on an equivalent water content of 65 per cent.

There may be a considerable variation, however, in the amount of plant food produced. Yearly total plant food output of one ton of livestock ranges from around 440 pounds for poultry to 900 pounds for hogs.

Phosphate Mostly in Solid Portion

About 95 per cent of the phosphate is in the solid portion of the manure, but only 57 per cent of the nitrogen and 40 per cent of the potash. This means that nearly half of the nitrogen and three fifths of the potash are in the liquid or urine portion of the excrement and will be lost unless proper steps are taken to preserve the liquid. Also included in the solid portion are appreciable amounts of calcium, magnesium and sulfur, and small amounts of manganese, zinc, copper and boron.

Careless handling and delay in spreading may cause the loss of as much as one half the plant food value of manure before it reaches the field. Failure to incorporate the manure into the soil promptly may result in additional losses.

Following are recommended steps for handling manure to preserve its value:

1. Use enough bedding to absorb the liquid portion which contains nearly half the nitrogen, about 60 per cent of the potash.
2. Add superphosphate to balance the plant nutrient content and absorb ammonia.
3. Store in covered building or shed, preferably with a tight floor.
4. Permit livestock to tramp the manure, if possible. Compaction excludes air and retards fermentation.
5. Spread in the field as soon as possible after it is produced, and incorporate promptly into the soil.

To absorb the liquid portion of manures, about 500 pounds of litter or bedding is required for each ton of excrement. From 3 to 4 pounds of every 5 pounds of fresh manure is water. About half of the water is held by the feces.

Common bedding materials vary somewhat in their ability to absorb liquid. Whole wheat straw will absorb about twice its weight in water. Whole oat straw is somewhat better. Cut or shredded straw and sawdust have about double the water holding capacity of uncut straw. Whole cornstalks are poor absorbents, but work very well when shredded. Peat moss and wood shavings are other good absorbents.

High protein feeds, such as soybean oil meal and 48 to 55 per cent protein dairy concentrates, are good buys for dairymen.

Standard allowances of uncut straw per animal per day are:

Animal	Daily Straw Requirement Per Head (Pounds)
Cattle	9
Steers	7 to 10
Horses	10 to 15
Hogs	1½
Sheep	1

Superphosphate is added to manure for two principal reasons: (1) To reinforce the phosphate content of the manure and improve the plant food balance, and (2) to absorb ammonia that escapes during fermentation thus reducing the loss of nitrogen.

The use of superphosphate in the barn also has some collateral benefits. It tends to create a cleaner, and therefore, a health-

ier, atmosphere for both animals and their handlers. There is reason to believe that it may tend to inhibit mastitis in cattle and sheep, and may also help to prevent other diseases such as foot rot and calf septicemia.

Feeding cows cooked or heated feeds may cut butterfat production as much as 50 per cent, Purdue University dairy specialists say. Studies show that cooked or heated feeds are broken down by rumen bacteria quite differently from unheated feeds.

Standard practice among dairymen is to use about 50 to 60 pounds of normal (18-20%) superphosphate per ton of manure. Horse and sheep manure, being more readily fermentable, require about 60 to 70 pounds per ton.

Daily rates of superphosphate are about as follows:

Cattle and Horses, 1-2 pounds per head; Hogs and Sheep, ½-1 pound per head; Chickens, 1 pound per 100 hens.

In the dairy barn, the phosphate usually should be spread on walkways and in gutters either before or after each cleaning. With horses, the application is best made just before cleaning the stable. Where manure is allowed to accumulate, such as in feeding barns and loafing sheds, it may be more convenient to make larger applications once a week. For chickens, the phosphate should be spread on the dropping board daily after each cleaning, or can be added to the litter heap.

If phosphate is not used in the barn, it may be scattered on each spreader load at the rate of about 60 to 75 pounds per load. This practice should be followed only where manure is spread in the field daily as it accumulates. Otherwise, substantial nitrogen losses will occur.

Studies in Ohio have shown that about 56 per cent of the total ammonia content of manure will have escaped by the end of 4 months if no preservative is used. When superphosphate is used properly in adequate quantities, this loss may be reduced.

Veterinarians advise farmers not to pen livestock in places where machinery is stored. Many greases and oils contain chlorinated compounds which can cause X disease in cattle.

The material value of using superphosphate with manure is, of course, in added crop production, lower crop production costs, and, therefore, greater profits. Numerous experiments have

shown that added crop returns may be 4 to 8 or more times the actual cost of the superphosphate used with the manure. On soils with high phosphorus-fixing capacities, phosphated manure has proved to be more effective in supplying phosphate to crops than either material applied separately. Even so, it usually will be necessary to supplement the phosphated manure with commercial fertilizer for top yields and profits.

When manure is stored in the open, it loses substantially both in nutrient value and in organic matter content. These losses are due largely to leaching and drainage. Where manure must be stored, it should be kept under cover, preferably in a closed shed with a tight floor.

Delinquency can be helped by keeping both parents and kids at home.

A Farmer's Prayer

By Samuel R. Guard, Editor of Breeder's Gazette

Oh Lamb of God, Who Didst Honor Every Farm on Earth by Being cradled in yon stable manger, we who are wont to abide in the fields come now to praise Thee for the peace that is on earth, the goodwill among men.

Lord of Hosts, be with us yet; be with our brave sons and daughters fair.

Even as this caken board glistens with good food, so may our centered faith be brightened with good deeds.

Such as feeding Thy sheep; doing unto others as we would be done by. So that all Thy children, everywhere, be free, and filled, and righteous altogether.

In the name of Him whose name shall be called Wonderful Counsellor, The mighty God, The Everlasting Father, The Prince of Peace, we ask it.

Amen.

How Big Should a Family Farm Be?

Farm management specialists say you should consider location, soil type, efficiency and personal stability . . .

Condensed from Kansas Farmer

Dick Mann

WHAT factors determine the success or failure of a farm business? Is the managing ability of the operator the main thing, or are there other factors equally important?

There is no denying the managerial ability of the farm operator is very important, but the same operator can make a success on one farm and fail on another.

Earl Means, supervisor for Farm Management Association No. 4, in Northeast Kansas, tells a story to bear this out. A friend of his was a very successful renter on a farm that was considered a good unit. He eventually made enough money to buy a farm. But the farm he bought was smaller. Due to lack of capital this man had to do everything on a small scale compared to his previous operations. The result is he never has been able to do much in the way of getting ahead.

So size of your farm is an important factor in your success or failure. Size is not always measured in acres, however. If your farm is properly located so you can specialize in such projects as dairying or poultry, you may be able to reach satisfactory volume on a relatively small farm.

Location of your farm is an important factor, along with type of soil. The more successful farmers have good bottom-land soil on which high crop production can be obtained.

Your farming program is a big factor. Your program may be more vulnerable to adverse weather conditions, for instance. The year 1956 was a good time to observe this. Farm management records in the Northeast Kansas district disclosed that one county had a large number of low-income farms for the year, due to the fact most of the farmers grew cash corn as a major crop. The corn was not profitable as grain. It would have made a good silage crop, but these farmers had no livestock and no experience in storing silage. They simply lost the value of the rough-

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age produced.

These same farms are high-income farms in good crop years. If you have plenty of capital and can afford to take this type of loss, that's your business. But a good livestock program to utilize roughages produced would help stabilize your farm business. "Livestock doesn't necessarily mean higher income over a longer period of time," says Mr. Means, "but it usually means a more stable income."

Efficiency is a big factor, whether it is in production of crops or livestock. To be successful every man on your farm should be getting in 300 man-workdays a year. A man-workday is the amount of work a man should be able to do in a 10-hour day, with average efficiency and average equipment.

To know that you don't know much, is to know much more than most people know.

If your present farm business takes fewer than 300 man-workdays, your labor efficiency and net income probably could be increased by handling more arces, larger livestock units, or more intensive livestock feeding programs, say farm management specialists.

Another important factor is availability of resources—the amount of capital you have to work with, or the backing you can get when needed. You can be a very good manager but you need capital to fully use your ability.

Do You Possess Stability of Character?

Your stability or lack of it is an important factor in success on the farm. The farmer who is constantly jumping from one thing to another, or who jumps into things without sufficient thought and planning, may be doomed to failure.

Overdiversifying may lead to failure. Says Mr. Means: "Every man is limited in his management ability. The more projects he tries to manage the more risk he runs of not managing them well, even tho he does tend to spread his financial risks. It is better to do a good management job on one or two large projects than a poor job on three or four small ones.

Failure to face up to facts may contribute to loss. A rather common example of this is a father who lacks capital to expand but who still tries to work a son into partnership on a farm too small to support both. In such cases both would be better off if the son finds work elsewhere, even tho leaving the farm may be hard to take.

Luck plays some part in nearly every farmer's success or failure, but there is no way to regulate

that except always to try to be in position to take advantage of opportunities that sometimes come unexpectedly.

The LeRoy Miller farm, in Pottawatomie county, Kansas, is a good farm to use in measuring success against some of the factors we have been discussing.

Mr. Miller bought the original 80 acres of his present farm 15 years ago, but was able to rent considerable additional land to give him volume in crop acres. All of it is good Kaw Valley bottom land that is highly productive.

"I have been adding to my original 80 acres every time I could buy and have continued to rent considerable acreage," says Mr. Miller. Today he owns 375 acres of bottom land but farms 500 acres, and rents enough pasture to bring his total farming unit up to 710 acres. He carries 200 heifers on a modified deferred-feeding program and markets 350 to 400 hogs a year. It would appear Mr. Miller is not overdiversified and that he has enough size in land and livestock projects to get maximum efficiency.

How Volume Production Helps

Farm management records show that on the average a man with more than 150 animals on a deferred-feeding program will use 1.1 man-workdays per animal, but that a farmer with a small bunch of steers or heifers might take 2.2 man-workdays per animal. In other words, volume allows feeders like Mr. Miller to cut their labor per animal unit to half what it takes the little fellow. Because of volume in his hog program, Mr. Miller has an opportunity to cut his man-workdays from one-half to one day for each sow farrowing.

Some irrigation and use of adequate fertilizer on all crop acres are methods Mr. Miller is using to boost his crop values per acre.

The best reservoir for storing water is the earth itself. A soil of good structure is capable of storing as much as 10 inches of water in a depth of 40 inches.

In 1956, his crop value per acre was $82.75 compared to $62 for the average bottom-land farm in his farm management area. His fertilizer cost was $5.38 per acre compared to the average of $4.01. Net returns per crop acre were $20 above the average.

Several factors accounted for this. Mr. Miller had 89 acres of wheat, which is large for the area. He irrigated 127 acres of milo, saving costs by drilling and weed spraying once. He also double-cropped some of his irrigated acreage. Thirty-three acres of his milo followed a 33-bushel wheat crop. The milo averaged 71 bushels. On 24 acres he harvested 40-

bushel barley followed by milo. Half of 70 acres of alfalfa on the farm was irrigated. Average production for irrigated and dry-land crop was 3.7 tons an acre. Silage made 19 tons an acre.

Last year was Mr. Miller's first try at irrigation so he believes he can get better production with experience.

The importance of size and total gross income in the success

If you want the low-down on somebody, ask an enemy, not a friend.

or failure of a farm is illustrated by comparing the 176 farms in Farm Management Association No. 4 for the year 1956. The high 25 per cent of the 176 farms had an average gross income of $25,452, the low 25 per cent an average of $10,401, and the average was $16,286.

Translated into net farm income, the top 25 per cent farms in gross income had an average profit of $8,527, compared to an average of $3,213 for all farms and an average loss of $904 for the 25 per cent in the low gross income bracket.

The big payoff comes in examining total farm expenses. The farms having an average gross income of $25,452 had average farm expenses of $16,925. But the farms having a total gross of $10,401 had average expenses of $11,306. So, you see, the top farms, because of volume, were able to produce more than $15,000 in additional income over the low farms at an average additional expense of only $5,619.

This is one of the basic lessons in farm production — that costs do not go up in proportion to gross income because of increased efficiency of larger units.

Good News for Hog Producers

Hog production is not increasing rapidly. The 1957 fall pig crop, farrowed June through November, was only 2 per cent larger than that of a year before — that is barely enough to match the increase in population. Farmers intend to increase spring farrowings only 6 per cent.

The facts above were shown in the semiannual pig crop report released by the U.S.D.A. The report was based on a survey of 149,000 farms in all parts of the country.

Biggest uncertainty about the hog market next fall is consumer demand. If business activity picks up early in 1958, the indicated increase of 6 per cent in supplies of hogs can be sold at good prices. Even if unemployment increases, hog prices do not seem likely to sag to the low levels of two years ago.

—*Illinois Farmers Outlook Letter*

Story of the Potato

Our most important vegetable crop and how it grew . . .

Condensed from American Vegetable Grower

R. T. Meister

THE potato claims the distinction of being the world's number one vegetable. In production it is second only to wheat among the food crops of the world. And in cash value the world potato crop of 6 million bushels is worth more than the annual production of gold and silver.

In the United States the potato ranks first among fruit and vegetable crops in dollar value, ahead of tomatoes, apples, oranges, grapes, peaches, and lettuce, in that order. Somewhere around the country in each of the four seasons potatoes are being harvested, for this vegetable is grown commercially in every state of the union.

Two out of five potatoes, roughly speaking, come from Maine, Idaho, or California. These states, in that order, lead the nation in producing the annual crop of 350 to 400 million bushels. About one-third of the crop is now grown on irrigated land. Mechanization in harvesting has found strong support among potato growers, and most of the commercial crop is now dug by machine. Alert to the demands of a quality-conscious market, the potato industry has made careful handling, grading, washing, waxing, and consumer packaging a standard part of their operations.

An important vegetable? Yes, indeed. But the potato has really struggled for its well-deserved recognition. It was discovered in South America over 400 years ago by Spanish explorers. As they scoured the Andean mountainsides for gold and silver, they noticed the Incas cooking, drying, and storing the tubers of this plant that grew wild on the mountainsides. The word, "potato," is thought to be derived from their understanding of the South American Indians' name for the plant, *papa* or *patata*.

Blinded by lust for the glittering treasures of the earth, the Spaniards virtually ignored the potato, scarcely mentioning it in

Reprinted by permission from American Vegetable Grower, Willoughby, Ohio

their chronicles. They carried it back to Europe around 1580, however, but it met with little enthusiasm except in Ireland, where it became the mainstay of the diet.

Farm-stored grain should be checked periodically. The top foot should be examined for presence of insects. A broomstick or long rod with thermometer attached should be pushed into the grain at several places. If one reading is several degrees warmer than others, insect activity is likely.

Scotch-Irish immigrants who settled at Londenberry, N. H., in 1719 introduced the potato to New England. It bore little resemblance to the present-day potato, being a small, kidney-shaped tuber with deep-sunk eyes, yellow flesh, and surface nodules. It tasted better than the South American potato, which had a wild, bitter, pungent flavor and odor, but was not very appetizing. In fact, the colonists generally regarded it is a poisonous aphrodisiac, so unwholesome that it would shorten life if eaten daily!

It took a rebreeding program to produce the modern potato. The blight which swept through Ireland spread to America in the mid-1800's, and it looked as though the crop could no longer be grown in this country. Not knowing that blight is caused by a fungus, scientists assumed that because the plant was no longer being propagated from seed, cuttings alone being used, the potato had degenerated genetically.

Proceeding on this theory, the Rev. Chauncy Enoch Goodrich, of Utica, N. Y., obtained wild potato seed from Chile and grew the Rough Purple Chile. From this came the Garnet Chile, which in turn was the parent of Early Rose. From these two varieties have come all the modern potato varieties of the United States.

With this rebreeding program came a great improvement in quality, and the development of the potato as a major food crop was rapid. Far from being regarded as unwholesome, the potato is recognized as a rich source of carbohydrates, vitamins, and minerals. During World War II the British Medical Association decided that, if Britain were limited to only two foods, the best choice would be potatoes and milk.

Truly *Solanum tuberosum*, "the tuber of the nightshade family," has come a long way from its South American mountainsides.

How They Grade Hay for Quality

Hay inspectors check samples for color, amount of leaf, maturity and amount of foreign material.

Condensed from Agricultural Marketing

Joseph B. Breslin, Government Hay Inspector

MAKE HAY while the sun shines — then sell that hay on the basis of U. S. grades and you can improve your market position. U.S. hay grades actually reflect the feeding value of hay —so a top grade hay should certainly bring the top market price.

The Grain Division of USDA's Agricultural Marketing Service provides standards for hay, which are used as the basis for determining grade, and supervises a staff of 114 inspectors who apply the grades.

These inspectors, who are either Federal employees or are Federally licensed, are thoroughly trained and are able to determine the grades of all the various kinds of hay (11 classes are graded) with a remarkable degree of efficiency.

Just to make sure that their work is accurate, they from time to time send "supervision samples" to the Grain Division's Washington laboratory. Here a "colorimeter" is used to measure the hay's color, and a botanical analysis is run to determine exact percentages of leaf, foreign material, and mixture of other kinds of hay in the hay sample.

Color, amount of leaf, maturity, and amount of foreign material are all factors used in determining hay grades. Their relation to the feeding value of hay has been determined by chemical analysis and by feeding tests, and these factors have formed the basis for hay standards since they were first issued back in 1923.

The tests, conducted by the U.S. Department of Agriculture, showed among other things that the amount of green color in the hay is directly proportionate to

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its protein value. They also pointed up the fact that about 70 per cent of the feeding value in a legume hay is in the leaf.

U.S. grades for hay are U.S. No. 1, No. 2, No. 3, and Sample grade. Any hay which does not meet requirements for one of the grades cannot be classified as hay.

Specifications for the four grades vary according to the type of hay being graded. Alfalfa hay, for instance, to grade U.S. No. 1 must have a minimum of 40 per cent leaf, must have 60 per cent green color, and may not contain more than 5 per cent foreign material. U.S. No. 1 timothy hay must meet a 40 per cent green color requirement and contain not more than 10 per cent foreign material.

To determine the grade of a lot of hay, any buyer or seller may call for an inspection. Inspection offices are generally located at shipping points or at terminal markets. The applicant is required to pay a fee for the service, based on the tonnage graded, and there is a minimum fee for small lots.

Detailed information on hay grades is contained in the "Handbook of Official Hay and Straw Standards." Single copies may be obtained free from the Office of Information, U.S. Department of Agriculture, Washington 25, D.C.

Vernal Price to be Higher; Supply Down

Farmers can expect to write bigger checks for Vernal alfalfa seed. Certified seed supplies are about one-third less than earlier expected.

But even with the increased cost, Leyton Nelson, farm crops specialist at Michigan State University, feels Vernal is still a good buy in Michigan.

Nelson says that research tests show that Vernal is a bargain even if it costs $10 a bushel more than certified Ranger. Yield tests show Vernal can out-yield Ranger by one-half ton hay per acre a year.

Vernal is a leafy, dark green, fine-stemmed plant that is winter hardy and is more resistant to leaf spot than is Ranger.

Because Vernal is higher yielding and a little more expensive, Nelson recommends that farmers use it in hay fields which will be kept for at least three years. Nelson also urges farmers to reserve their seed supplies for next spring right away. He feels the local dealer is the best place to order the needs.

—Michigan State University

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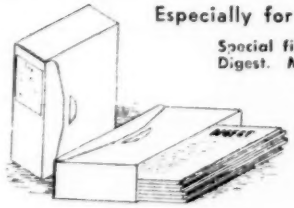

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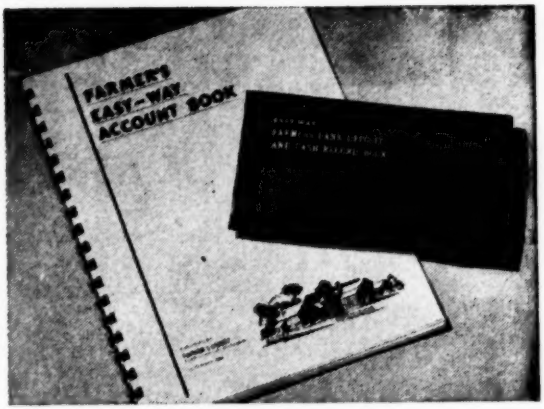

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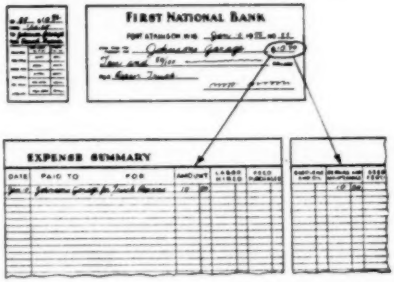

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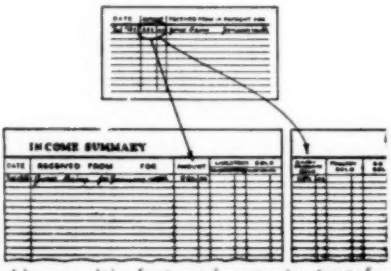

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